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2005 Annual Screening-Level Analysis:

Supporting the Annual Review of Existing Effluent Limitations Guidelines and Standards and Identification of Potential New Categories for Effluent Limitations Guidelines and Standards

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1.0 INTRODUCTION

Under the Clean Water Act (CWA), EPA establishes national technology-based regulations known as “effluent guidelines and pretreatment standards” to reduce pollutant discharges from categories of industry discharging directly to waters of the United States or discharging indirectly through Publicly Owned Treatment Works (POTWs). The CWA sections 301(d), 304(b), 304(g), and 307(b) require EPA to annually review these effluent guidelines and pretreatment standards.

This document supports EPA's 2005 review of its existing effluent guidelines and pretreatment standards. It also presents EPA's evaluation of categories of indirect dischargers without pretreatment standards to identify potential new categories for pretreatment standards, as required under CWA sections 304(g) and 307(b). Additionally, CWA section 304(m) requires EPA to biennially publish an effluent guidelines program plan and provide for public notice and comment on such plan. Therefore, this document also supports the preliminary 2006 effluent guidelines program plan (“2006 Plan”). Included in the preliminary 2006 plan is a solicitation for comments and data on industry categories currently not subject to any effluent guidelines that are discharging non-trivial amounts of toxic or non-conventional pollutants.

EPA’s annual review of effluent guidelines and pretreatment standards has several components. First, EPA reviews all industrial categories subject to existing effluent limitations guidelines and standards to identify potential candidates for revision, as required by the Clean Water Act sections 304(b), 301(d), 304(g) and 307(b). The findings of this review are discussed in section 7.0 of this report. Second, EPA reviews direct discharging industries not currently subject to effluent limitations guidelines to identify potential candidates for effluent limitations guidelines development, as required by section 304(m)(1)(B) of the Act. The findings of this review are discussed in section 5.4 of this report. Finally, EPA reviews indirect discharging industries not currently subject to pretreatment standards to identify potential candidates for pretreatment standards development, as required by section 307(b). The findings of this review are discussed in section 5.4.2 of this report.

In conducting this screening level analysis, EPA uses readily available information from the Toxics Release Inventory (TRI) and the Permit Compliance System (PCS) to estimate the magnitude and toxicity of discharges from these industrial wastewater discharges. For its 2005 review, EPA used information as reported to TRI and PCS for 2002. EPA used 2002 data because these were the most recent TRI data available at the time it began the 2005 annual review. EPA used 2002 PCS data to reflect the same reporting year. EPA's 2005 screening level review is similar to that used for its 2003 and 2004 annual reviews. See *Technical Support Document for the 2004 Effluent Guidelines Program Plan*, EPA-821-R-04-014, http://epa.gov/guide/304m/tsd.pdf, August 2004.

This report describes the development of the databases that EPA used in conducting its 2005 screening-level analysis. It also presents the results of the 2005 screening-level analysis. The remainder of this report is divided into the following sections:

- Section 2.0 - Development of *PCSLoads2002*;
- Section 3.0 - Development of *TRIReleases2002*;
- Section 4.0 - Toxic weighting Factors (TWFs);
- Section 5.0 - Identification of Point Source Categories;
- Section 6.0 - Quality Review.; and
- Section 7.0 - Results of 2005 Screening-Level Analysis.

2.0 DEVELOPMENT OF *PCSLOADS2002*

The Clean Water Act (CWA) requires EPA to annually review industrial categories regulated by existing effluent guidelines and pretreatment standards. After identifying and considering a number of sources of data, EPA used data reported to the Permit Compliance System (PCS) to estimate the mass of pollutants directly discharged by industry categories to surface waters ("direct dischargers"). As discussed in section 2.2.1.5, the PCS database has a number of limitations including only having very limited data on pollutant discharges from industrial facilities to POTWs ("indirect dischargers"). Consequently, EPA was not able to use PCS data for its review of existing pretreatment standards or indirect discharging industries not currently subject to pretreatment standards.

EPA estimated the hazard of the discharged pounds of pollutants by calculating hazard scores using pollutant-specific toxic weighting factors (TWFs). These TWFs reflect both aquatic life and human health effects. Multiplying the pounds of pollutants discharged by their TWFs results in an estimate of toxic-weighted pound equivalents (TWPE). EPA used the same TWFs traditionally used in the Effluent Guidelines Program to quantify the relative toxicity of pollutant discharges. EPA assigns toxicity based on both aquatic life effects and human health effects and additively combines them in one pollutant-specific TWF. EPA's hazard analysis used these toxic weights because EPA believes they are sufficient to estimate hazard in a screening exercise and they are used in the cost-effectiveness methodology EPA employs to develop effluent limitation guidelines. EPA also combined the TWPE calculated from the PCS data and TRI data (see Section 7) into a single TWPE number for each industrial sector. EPA used this number to prioritize its review of industry categories subject to existing effluent guidelines, based on those that appeared to offer the greatest potential for reducing hazard to human health or the environment.

This section discusses how EPA compiled data together for estimating the mass and toxicity of pollutants discharged by industry categories. EPA compiled the data in a database titled, *PCSLoads2002*. This database presents the output for all facilities classified as major dischargers in PCS for the year 2002 and for point source categories that these facilities represent. Attachment 1 presents the *PCSLoads2002* output on a four-digit SIC code and pollutant parameter basis. The remainder of Section 2 is organized in the following subsections:

- Section 2.1 presents an overview of the *PCSLoads2002* database;
- Section 2.2 describes the data sources and database development tools for *PCSLoads2002*;
- Section 2.3 discusses EPA's data sensitivity analyses;
- Section 2.4 presents the results of the *PCSLoads2002* database; and
- Section 2.5 provides a list of references.

2.1 Overview of *PCSLoads2002*

EPA used year 2002 data from PCS, the Effluent Data Statistics (EDS) System, and two additional databases, *PCSLoadCalculator* and *PCSLoadsAnalysis2002*, to develop *PCSLoads2002*. These data sources and database development tools are described below:

- PCS: This mainframe database is the source of the pollutant discharge data and facility information used in the development of *PCSLoads2002*. PCS was created by EPA to track permit, compliance, and enforcement status of facilities regulated by the National Pollutant Discharge Elimination System (NPDES) program under the CWA.

- EDS: This mainframe computer program calculates annual pollutant loads using monthly measurement data reported in PCS.

- *PCSLoadCalculator*: This PC-based database implements EPA's Annual Load Calculator Routine, which EPA created as a supplement to the EDS system to provide data for facilities that were missing from EDS outputs.

- *PCSLoadsAnalysis2002*: This PC-based database combines the annual loads data from EDS and *PCSLoadCalculator* and applies the user-defined options in EDS that EPA selected based on the results of the data sensitivity analyses discussed in Section 2.3. The *PCSLoadsAnalysis* database creates the "PCS2002" Table, which provides one annual load per pollutant discharge.

Figure 2-1 shows the relationship between PCS, the EDS system, EPA's *PCSLoadCalculator, PCSLoadsAnlaysis2002*, and *PCSLoads2002*. Section 2.2 of this report discusses each data source and database development tool in more detail.

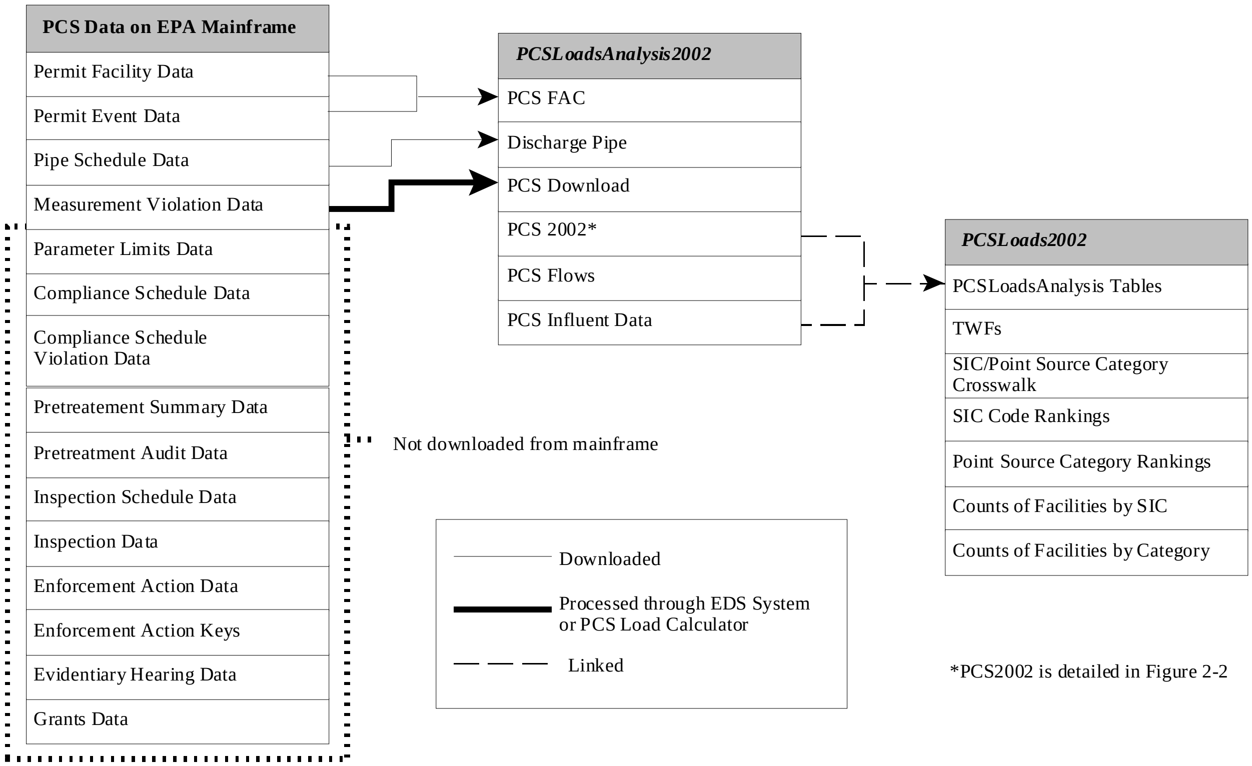

Figure 2-1. Relationship Between *PCSLoads2002* and PCS

The *PCSLoads2002* database uses the "PCS2002" Table from *PCSLoadsAnalysis2002* along with TWFs, Chemical Abstract Service (CAS) numbers, and the SIC/Point Source Category Crosswalk to calculate TWPE and generate point source category rankings for each industrial category. Table 2-1 describes the function of each table in *PCSLoads2002*.

Table 2-1. Tables Imported or Created in *PCSLoads2002*

Table Name	Created or Imported	Description
PRAM Codes	Imported from *PCSLoads2000*	Lists pollutants and parameter codes used for them in PCS.
SIC/Point Source Category Crosswalk	Imported from *PCSLoads2000* and updated	Links SIC codes with point source categories using a numeric code assigned in the Point Source Category Codes table.
Point Source Category Codes	Imported from *PCSLoads2000*	Assigns a numeric code to industrial categories using their 40 CFR part or 2-digit or 4-digit SIC Code.
SIC Codes	Imported from *PCSLoads2000*	Lists SIC codes and their descriptions.
SUPERCAS Category	Imported from *PCSLoads2000*	Links CAS numbers to pollutant parameter codes.
TWFs	Imported from *PCSLoads2000* and updated	Assigns TWF values to chemicals by CAS number.
PCS FAC	Linked from *PCSLoadsAnalysis2002*	Presents information on permitted facilities, such as facility name, location, major/minor discharge status, and date of most recent permit issuance
PCS2002	Linked from *PCSLoadsAnalysis2002*	Presents the annual loads in pounds per year for each pipe-specific pollutant discharge at permitted facilities.
Discharge Pipe	Linked from *PCSLoadsAnalysis2002*	Provides pipe descriptions for discharge pipe numbers in PCS2002.
PCS Flows	Linked from *PCSLoadsAnalysis2002*	Presents the annual flow in millions of gallons per year for each outfall at permitted facilities.
PCS Influent Data	Linked from *PCSLoadsAnalysis2002*	Presents any influent monitoring data obtained from PCS in pounds per year.
Counts of Facilities by SIC	Created using queries	Includes counts of major and minor facilities the report to PCS by SIC code.
Counts of Facilities by Category	Created using queries	Similar to table Counts of Facilities by SIC; however, it reports the counts by category.
SIC Code Rankings	Created using queries	Presents rankings of SIC codes based on calculated TWPE.
Point Source Category Rankings	Created using queries	Presents rankings of categories based on calculated TWPE.

The “PCS2002” Table identifies pollutants using PCS parameter codes. TWFs, however, are assigned to chemicals identified by CAS numbers. As a result, EPA developed a crosswalk that links CAS numbers to parameter codes. The crosswalk linking parameters to CAS numbers and TWFs is discussed in Section 2.1.1.

PCS2002 also assigns a facility's discharge to an industrial category using 4-digit SIC codes. Point source categories are not generally defined by SIC codes. As a result, EPA developed a second crosswalk that links point source categories to 4-digit SIC codes. The crosswalk linking SIC codes and point source categories is discussed in Section 2.1.2.

2.1.1 Assigning TWFs to PCS Parameters

To identify potential impacts on human health and the environment, EPA estimates toxic equivalent mass discharge through the use of TWFs. Section 4.0 of this report discusses TWFs in more detail. Chemicals for which EAD has developed TWFs are identified by CAS number. To assign TWFs to reported discharges, EPA used a table named "SUPERCAS" (developed in earlier work with PCS and TRI data) to link CAS numbers to pollutant parameters reported in PCS. EPA has expanded the SUPERCAS list of chemicals by identifying CAS numbers for priority pollutants and chemicals that are frequently reported. EPA obtained the CAS numbers from www.ChemFinder.com. EPA made the following assumptions to assign CAS numbers to PCS pollutant parameter:

- All forms of a pollutant were assigned the same CAS number (e.g., Dissolved Copper, Total Recoverable Copper, and Total Copper (as Cu) were all assigned the CAS number for Copper); and

- Chemicals that were reported in different ways were assigned only one CAS number (e.g., Nitrate (as NO_3) and Nitrate (as N) were both assigned the CAS number for Nitrate.

Once the CAS numbers were assigned to each PCS parameter using the expanded SUPERCAS file, the TWFs were assigned by matching the CAS numbers. EPA did not assign TWFs to all parameters reported in PCS. EPA did not identify CAS numbers for chemicals infrequently reported. In addition, there are no CAS numbers for non-chemical parameters reported in PCS (e.g., total suspended solids, BOD_5, COD, etc.).

EPA estimated the TWFs for certain parameters that were reported as chemical groups based on transfers from existing TWFs. Table 2-2 lists these parameters and the method of TWF assignment.

Table 2-2. TWF Assignment for Chemical Mixtures

Parameter Code	Parameter Description	Method of TWF assignment
78216	Aldrin + Dieldrin	Average of aldrin and dieldrin TWFs
82699	Endrin + Endrin Aldehyde (Sum)	Average of endrin and endrin aldehyde TWFs
30383	Benzene, Ethylbenzene, Toluene, and Xylene	Average of benzene, ethylbenzene, toluene, and xylene TWFs
34034	Chlorinated Phenols	Average of the TWFs for PCS parameters 2,4,6-trichlorophenol, pentachlorophenol, 2,4-dichlorophenol, and 2-chlorophenol (most common chlorinated phenols)
74105	Phenols, Chlorinated	Average of the TWFs for PCS parameters 2,4,6-trichlorophenol, pentachlorophenol, 2,4-dichlorophenol, and 2-chlorophenol (most common chlorinated phenols)

2.1.2 SIC/Point Source Category Crosswalk

EPA has developed ELGs for point source discharges from 56 specific categories. The point source categories, which may be divided into subcategories, are generally defined in terms of combinations of products made and the processes used to make these products. Facilities with data in PCS are identified by SIC code. Thus, to use the PCS data to estimate the pollutants discharged by each point source category, EPA assigned each 4-digit SIC code to an appropriate point source category using the “SIC/Point Source Category Crosswalk” table. Section 5.0 of this report discusses the crosswalk in more detail.

2.1.3 Development of 2002 PCS Rankings

As shown in Figure 2-2, *PCSLoads2002* links information from the “PCS2002" Table, SUPERCAS, the SIC/Point Source Category Crosswalk, and TWFs to create point source category rankings. The SIC codes in the “PCS2002” Table are specific to each parameter, discharge pipe, and facility (NPDES permit number). This allows EPA to make SIC adjustments to differentiate between various operations/outfalls at one facility. Some facilities have multiple operations that are subject to more than one categorical ELG. However, facilities generally report a single primary SIC code to PCS. For example, SIC code 2899 discharges are counted in the Organic Chemicals, Plastics and Synthetic Fibers (OCPSF) category. However, EPA identifies pesticides discharged by facilities in SIC code 2899 and assigns them an SIC code of 2899P. Discharges for SIC code 2899P are then counted in the Pesticide Chemicals Category because these discharges are subject to regulation under the Pesticide Chemicals ELG. In developing the rankings, EPA associated the SIC codes with the appropriate point source categories using the SIC/Point Source Category Crosswalk and Point Source Category Codes tables. EPA associated TWFs with each parameter reported in PCS using the “SUPERCAS” and “TWFs” tables.

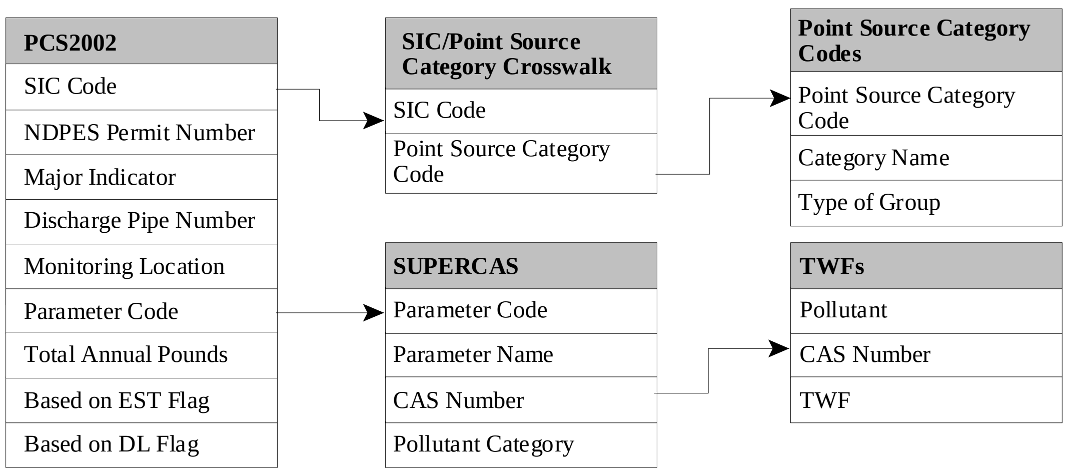

Figure 2-2. *PCSLoads2002* Database Structure

2.2 Data Sources and Development Tools

As stated previously, EPA used year 2002 data from PCS, the EDS system, and two additional databases: *PCSLoadCalculator* and *PCSLoadsAnalysis2002*, to develop *PCSLoads2002*. The following sections describe each data source and database development tool in more detail.

2.2.1 PCS

PCS is a major source of data for EPA's screening level review of existing effluent guidelines and pretreatment standards. PCS is a computerized management information system maintained by EPA's Office of Enforcement and Compliance Assurance[1]. EPA created PCS to track permit, compliance, and enforcement status of facilities regulated by the NPDES program under the CWA.

2.2.1.1 NPDES and How It Relates to PCS

As authorized by the CWA, the NPDES program controls water pollution by regulating point sources that discharge pollutants directly into waters of the United States. Specifically, Title IV, Permits and Licenses, of the Federal Water Pollution Control Act created the NPDES system for permitting wastewater discharges (Section 402). The Water Permits Division within EPA's Office of Wastewater Management leads and manages the NPDES permit program in partnership with EPA Regional Offices, states, tribes, and other stakeholders. Industrial, municipal, and other facilities must obtain NPDES permits if they discharge directly to surface waters. In most cases, the NPDES permit program is administered by authorized states.

NPDES permits are issued only to direct point source dischargers (i.e., those entities that discharge directly into the receiving water body.) PCS does not contain data for indirect dischargers (those entities that discharge to POTWs).

More than 65,000 industrial facilities and municipal wastewater treatment plants have obtained permits for discharges of regulated pollutants. To provide an initial framework for setting permit issuance priorities, EPA developed a major/minor classification system for industrial and municipal wastewater dischargers. Each permitting authority establishes its own definitions, but major dischargers have the capability to impact receiving waters if not controlled

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[1]To access PCS on EPA's mainframe online, the user must obtain a user ID and password from EPA. For more information, see the Permit Compliance System Generalized Retrieval Training Manual [1].

and, therefore, have been accorded more regulatory attention than minor dischargers. There are approximately 6,400 major facilities in PCS. Facilities are classified as major based on an assessment of six characteristics: (1) toxic pollutant potential; (2) flow/stream flow volume; (3) conventional pollutant loading; (4) public health impact; (5) water quality factors; and (6) proximity to coastal waters.

Facilities with major discharges must demonstrate compliance with NPDES permit limits by submitting monthly Discharge Monitoring Reports (DMRs) to the permitting authority. The permitting authority enters the reported DMR data into PCS, including the type of violation (if any), measured concentration and quantity values, and Quarterly Non-Compliance Report (QNCR) indicators.

EPA does not require permitting authorities to enter DMR data for minor dischargers into PCS. Therefore, extensive data are not available for minor discharges in PCS.

2.2.1.2 General Overview of PCS

EPA developed PCS in 1974. PCS automates entry, updating, and retrieval of NPDES data and tracks permit issuance, permit limits and monitoring data, and other data pertaining to facilities regulated under NPDES. Major dischargers are required to submit effluent monitoring data to the permitting authority on DMR forms. The permitting authority then enters these data into PCS and evaluates them for compliance with the NPDES permit requirements. Facilities report pollutant discharges to PCS as a mass-based quantities and concentrations using a wide variety of units. PCS also includes information on the facility’s permit requirements, such as monitoring frequency. Parameters in PCS include water quality parameters (e.g., dissolved oxygen and temperature), specific chemicals (e.g., phenol), bulk parameters (e.g., biochemical oxygen demand), and flow.

2.2.1.3 PCS Data Structure

The PCS database contains more than 8 million records organized by individual permit files. Each permit file contains the following types of information:

- Basic data on the permit and the permitted facility, such as permit number, dates of issue and expiration, facility name, location, and type of facility;
- Data tracking permit events, such as date application was received, scheduled, and achieved dates for completion of compliance schedules;
- Data identifying each outfall within the facility and describing the associated monitoring requirements;
- Data specifying the parameters to be measured at each outfall and the corresponding limitations; and
- Data describing inspections performed at the facility, such as type of inspection, inspector identity, and inspector comments.

PCS categorizes data elements into 14 different "data types" listed in Table 2-3. EPA uses data in the Permit Facility, Pipe Schedule, Permit Event, and Measurement Violation data types to develop *PCSLoads2002*.

Table 2-3. Data Types in PCS

Data Type	Description	Included in *PCSLoads2002*
Compliance Schedule Data	Information related to a schedule of milestone events that a permitted facility must accomplish in order to upgrade the quality of its effluent discharge when that has been established as a condition of the facility's being granted a permit. Compliance schedule data tracks the scheduled versus achieved dates for each milestone event and belongs to a logically-related family of data types that includes permit facility data and compliance schedule violation data.	No
Compliance Schedule Violation Data	Information related to violations of the compliance schedule where applicable to a facility, whether from failure to meet a milestone date or failure to submit required report data. Compliance violation data belongs to the family of logically-related data types that includes permit-facility data and compliance schedule data.	No

Table 2-3 (Continued)

Data Type	Description	Included in *PCSLoads2002*
Inspection Scheduling Data	Information describing inspections that are scheduled to be conducted at a permitted facility, including the scheduled date of the inspection, the scheduled inspection type, the scheduled inspector, and relevant comments. Inspection scheduling data, inspection data, Pretreatment Audit/PCI data, and permit facility data make up a distinct family of logically-related data types.	No
Inspection Data	Information describing inspections that have been performed at a permitted facility, including the date of the inspection, the type of inspection and by whom t was performed, and relevant comments. Inspection scheduling data, inspection data, Pretreatment Audit/PCI data, and permit facility data make up a distinct family of logically-related data types.	No
Pretreatment Audit/PCI Data	Data related to Pretreatment Audits/PCI Inspections contain detailed information about Pretreatment that was gathered as pert of the inspection.	No
Enforcement Action Data	Data related to enforcement actions that have been taken in response to violations of effluent parameter limits, non-receipt of DRMs, or compliance schedule milestones, including the events in violation and dates of occurrence, the type of enforcement action(s) and the dates they were taken, the current status of each action, etc.	No
Evidentiary Hearing Data	Data related to evidentiary hearings which are held wen permittees wish to appeal or negotiate limits or compliance schedule requirements.	No
Grant Data	Data related to the tracking and status of grants received by POTWs to help finance construction undertaken to meet compliance schedule requirements.	No
Permit Facility Data	General descriptive information on each permitted facility (such as its name, address, classification and design flow rate). Because it contains the basic information regarding a permit, permit-facility data is the one data type that belongs to all of the families of logically related data types.	Yes
Pipe-Schedule Data	Detailed information describing each outfall within a permitted facility and the discharge monitoring requirements associated with each (such as effluent waste types, treatment types and limit stat and end dates-initial, interim, or final).	Yes
Parameter-Limits Data	Detailed information specifying the monitoring requirements associated with each outfall within a permitted facility (such as monitoring location, the parameter to be monitored, the required frequency of analysis, the units in which the measurements are expressed, and the quantity and concentration limits for each parameter).	No
Measurement-Violation Data	Detailed information on the reported measurement values for effluent parameters including those that are in violation of established limits for the permit, the type of violation, the reported number of excursions, the actual measurement values, and the percentage by which a measurement exceeds quantity and/or concentration limits.	Yes

Table 2-3 (Continued)

Data Type	Description	Included in *PCSLoads2002*
Permit Events Data	Information tracking the events relating to the issuance of a permit, from initial receipt pf the application for a permit through actual permit issuance.	Yes
Pretreatment Performance Summary Data	Information gathered as part of the Pretreatment Annual Report is stored in this data type.	No

Source: Permit Compliance System Generalized Retrieval Training Manual, Table 1-1, pg 1-4. [1]

2.2.1.4 Utility of PCS

The data collected in PCS are particularly useful for the 304(m) review process for the following reasons:

- PCS is national in scope, including data from all 50 states and U.S. territories;
- Discharge reports included in PCS are based on effluent chemical analysis and metered flows;
- PCS includes direct discharging facilities in any SIC code; and
- PCS includes data on conventional pollutants for most facilities and for the nutrients nitrogen and phosphorus for many facilities.

2.2.1.5 Limitations of PCS

Limitations of the data collected in PCS include the following:

- PCS contains data only for pollutants a facility is required by permit to monitor; the facility is not required to monitor or report all pollutants actually discharged;
- Some states do not submit all DMR data to PCS, or do not submit the data in a timely fashion;
- PCS includes very limited discharge monitoring data from minor dischargers;

- PCS includes very limited data characterizing indirect discharges from industrial facilities to POTWs;

- Many of the pollutant parameters included in PCS are not chemical compounds (e.g., “total Kjedahl Nitrogen,” “oil and grease”) and cannot have TWFs;

- In some cases, the PCS database identifies the type of wastewater being discharged; however, most reported flow rates do not indicate the type of wastewater and therefore, total flow rates reported to PCS may include stormwater and noncontact cooling water, as well as process wastewater.

- Some facilities in PCS do not provide information on applicable SIC codes.

- Facilities only provide SIC code information for the primary operations even though data may represent other operations as well.

- Facilities are identified by SIC code, not point source category. For some SIC codes, it may be difficult or impossible to identify the point source category that is the source of the reported wastewater discharges.

- PCS was designed as a permit compliance tracking system and does not contain production information.

- PCS data may be entered into the database manually, which leads to data-entry errors.

Despite the limitations and constraints of data in PCS, EPA has determined that the data are appropriate for an initial screening-level review and prioritization of the pollutant loadings discharged by industrial categories. EPA will further evaluate the prioritized categories in a second level of review, which may include additional data collection and additional verification of data reported in PCS.

2.2.2 Effluent Data Statistics (EDS) System

For its screening-level analysis, EPA used a mainframe computer program called the EDS system to estimate annual pollutant loads for each facility reporting in PCS. For more information on how the EDS program works, see “Guidance and Standards for Calculating Point Source Loads Using the Permit Compliance System (PCS)” [2]. Chapter 7 of the “Permit

Compliance System Generalized Retrieval Training Manual" [1] provides information regarding EDS access.

2.2.2.1 EDS Methodology

As explained in Section 2.2.1, PCS contains extensive information on permitted facilities. EPA does not use all of the information in PCS for its screening-level analysis. As described in Section 2.2.1.3, EPA retrieves data from the permit facility data and measurements-violations data types. Not all information included in the measurements-violations data type is relevant for EPA's screening-level analysis. Facilities report pollutant discharges to PCS for internal monitoring locations as well as final outfalls. In addition, pollutant discharges may be reported as a mass quantity or a concentration using a wide range of units. Because EPA's goal is to use the PCS discharge information to characterize pollutant loading to receiving streams, EPA developed a methodology for selecting relevant PCS data for its annual loads calculations. This methodology is described below.

Monitoring Location Selection

Permits often require a facility to monitor at multiple locations. The monitoring location is indicated in PCS in the MLOC field. For its screening level review, EPA estimates annual loads that represent effluent discharges. PCS has many MLOC codes including two that represent effluent discharges:

- MLOC 1 - Effluent gross discharge; and
- MLOC 2 - Effluent net discharge.

Therefore, the EDS searches the monitoring field location (MLOC) in PCS to find effluent data only (MLOC 1 or MLOC 2).

When more than one type of effluent data is present for an outfall, MLOC 2 is used in preference to MLOC 1. If data are not provided for either MLOC 1or 2, EDS processes the following monitoring locations as effluent gross discharges:

- The sum of discharges at MLOC B (Monitoring prior to disinfection process) and MLOC A (Monitoring after disinfection process); or

- Any monitoring location that is labeled with a pound sign (#) to indicate the data represent effluent discharges.

EDS can also process influent data (MLOC G). However, EPA separates the influent and effluent data in the EDS output, and excludes the influent data from the screening-level analysis.

Measurement Value Selection

PCS contains five measurement value fields, in which facilities may report measured data for a pollutant. These include:

- Average Quantity (MQAV);
- Maximum Quantity (MQMX);
- Minimum Concentration (MCMN);
- Average Concentration (MCAV); and
- Maximum Concentration (MCMX).

Facilities may use a variety of measurements to populate the above five measurement value fields. For example, a facility can use a monthly average, daily average, 30 day geometric average, etc. to represent the average quantity (MQAV). PCS contains a statistical base code field for each of the five measurement value fields to define the type of measurement that is reported. For example, the statistical base code "WA" means "Weekly Average." There are approximately 150 different statistical base codes used to describe measurements reported in PCS. EDS uses the descriptions provided by the statistical base codes to select measurement values that represent average discharges.

EDS categorizes the 150 statistical base codes as representing average, maximum, minimum, or total measured values. EDS then simplifies the statistical base code reported for each of the five measurement value fields by assigning it a number from 0 to 4 as follows:

- 0 - No Value Reported;
- 1 - Average;

- 2 - Total Monthly Value;
- 3 - Maximum; and
- 4 - Minimum.

EDS combines the PCS statistical base codes assigned to each of the five measurement values into one five-digit code called the STAT. Each of the five digits in the STAT corresponds to one of the five measurement fields for pollutant loads or concentrations. Figure 2-3 shows an example of a possible STAT code. In this figure, the measurements reported for MQAV, MCAV, and MCMX are based on average values, MQMX is based on maximum values, and no value was reported for MCMN.

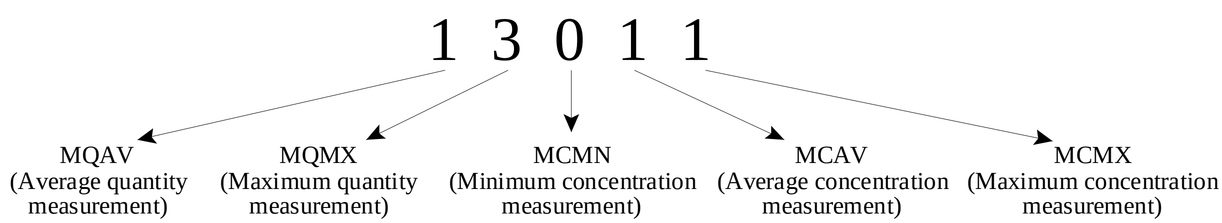

Figure 2-3. Example EDS Statistical Base Code

The measurement value selection is a two-step process in EDS. In the first step, EDS attempts to identify an average value using the STAT and a measurement field hierarchy. This first hierarchy defines a value as average if its STAT digit is equal to 1, regardless of which measurement value field it populates. EDS searches each STAT digits corresponding to the PCS measurement fields in the following sequence, or hierarchy:

- Average Load (MQAV);
- Maximum Load (MQMX);
- Average Concentration (MCAV);
- Maximum Concentration (MCMX); or
- Minimum Concentration (MCMN).

A measurement must meet two criteria to be selected for loads calculation. The mass quantity or concentration must be nonzero, and the corresponding STAT digit for the measurement value field must equal 1.

The first hierarchy may not be successful in identifying an average value to use for the load calculation for the following reasons:

- The STAT may not contain a 1 in any of its digits;
- The STAT may contain a 1, but the measurement value field may be blank due to a data entry error; or
- Data entry of the statistical base codes in PCS may be incomplete or incorrect.

If EDS cannot identify a measurement that meets the above criteria, it uses a second hierarchy to select a measurement field for the load calculation. In this second hierarchy, EDS abandons the STAT code and selects measurement values based on which field they populate:

- The average load (MQAV) field is used if it contains a non-zero value;
- If MQAV cannot be used, and a flow rate is reported, the concentration fields are searched in the following order and the first nonzero concentration is multiplied by the flow to calculate the load:
  - — Average Concentration (MCAV),
  - — Maximum Concentration (MCMX), and
  - — Minimum Concentration (MCMN); and
- If flow and concentration cannot be used to calculate the load, the maximum load (MQMX) is used.

EDS uses a similar hierarchy for selecting flow rates:

- Average Quantity Flow (FMQAV);
- Average Concentration Flow (FMCAV);
- Maximum Concentration Flow (FMCMX);
- Minimum Concentration Flow (FMCMN); and
- Maximum Quantity Flow (FMQMX).

Misreported units are a common problem for flows in PCS. EDS attempts to correct this problem by assuming that any flow rate that is greater than 1,300 million gallons per day (MGD) should actually be reported as gallons per day (GPD), and divides the flow by one million.

2.2.2.2 User Defined Options in EDS

After completing the measurement value selection for a particular facility, EDS has condensed the PCS data to one quantity or concentration and flow rate per month, per parameter, per pipe, per monitoring location, per facility. However, to calculate annual loads, EDS uses several assumptions. Some assumptions are built into the design of EDS and cannot be altered. However, others may be varied depending on “user-defined options” in the EDS program. These options include:

- Varying the numerical value assumed for results reported as below detection level (BDL);
- Estimating monthly loads where DMR data are missing in PCS; and
- Grouping loads of parameters that represent the same pollutant to avoid double-counting.

These options are discussed in more detail below.

Detection Limit Options (DL). When pollutants are measured at concentrations below their detection limit (BDL), permittees may report the detection limit with a “less-than” sign (<) to indicate that the pollutant was measured BDL. If a pollutant is measured BDL, the pollutant concentration may be between zero and the detection limit. The EDS user may assume a concentration for the BDL pollutant using one of three options:

- BDL equals zero;
- BDL equals the detection limit; or
- BDL equals one-half the detection limit.

For the 2003 and 2004 annual reviews, EPA developed a fourth option for BDL referred to as the Hybrid Method. Using this method, EPA first calculated the annual load for a parameter by setting BDL = 0. If the calculated annual parameter load was zero, EPA concluded that in all DMRs for the year, the parameter was measured as BDL, and used zero for the concentration of this parameter. However, if the annual load calculated by setting all BDL measures to zero was greater than zero, EPA concluded the parameter was sometimes detected. In this case, EPA assumed that the parameter could be present in the facility's discharge and used one-half the detection limit for the concentration for this parameter where it was reported BDL. For the current review, EPA used the Hybrid Method to calculate annual parameter loads. Section 2.3.1 describes EPA's analysis of the BDL options and why its selection of the hybrid method is reasonable.

Estimation Option (EST). DMR data may be missing from PCS as a result of delays in facility reports to the state or in the state's data entry into PCS. In addition, as discussed in Section 2.2.1.5, data-entry errors can occur when uploading DMR data to PCS, which may result in incomplete PCS data for some facilities. When certain data elements are missing, such as parameter codes or units codes, EDS cannot estimate loads for that discharge. To avoid underestimating pollutant loads, EDS includes an estimation option (EST) that uses an average discharge for months to fill in where DMR data are incomplete in PCS.

To correctly identify missing DMR data in PCS, EDS must account for variations in monitoring frequencies for pollutants and periods of no discharge at a facility's outfall. The following paragraphs discuss how EDS uses the Number of Units per Reporting Period (NRPU) and No Data Indicator (NODI) data elements in PCS to determine when it is appropriate to estimate a discharge.

Monitoring frequencies may vary for certain pollutants or outfalls depending on the facility's permit requirements. Discharges may be reported monthly, quarterly, semiannually, or annually. The NRPU data element is a numeric code that indicates whether a pollutant is monitored monthly (NRPU = 1), quarterly (NRPU = 3), semiannually (NRPU = 6), or annually (NRPU = 12). EDS sums the NRPU values associated with the reported discharges to determine if all DMR data for the pollutant are present in PCS. If the sum of the NRPU values equals 12, then all required discharge data are present for that reporting year. For example, if a facility is required to monitor quarterly, the NRPU assigned to each quarterly report is 3. If four quarterly reports are present, the total NRPU is 12 (3+3+3+3), indicating all required reports are present.

For monitoring periods where no pollutant quantities or concentrations are reported, EDS can distinguish between missing data and periods of no discharge using the NODI data element. NODI is a single character code that indicates why pollutant measurements are blank for a reporting period. For example, NODI = C means that no discharge occurred for that monitoring period. When calculating the sum of NRPU, EDS includes NRPU values for blank records that are labeled with a NODI that indicates that no discharge occurred for that monitoring period. EDS assumes no discharge for the following NODI codes:

- C: No discharge;
- D: Lost sample;
- E: Analysis not conducted;
- F: Insufficient flow for sampling;
- G: Sampling equipment failure;
- H: Invalid test;
- K: Flood disaster;
- 5: Frozen conditions; and
- 8: Other.

By including the NRPU values associated with the above NODI codes in the sum, EDS ensures that blank records for periods of no discharge are not identified as “missing DMR records” from PCS. However, if a blank field is labeled with a NODI that indicates that a discharge was sampled but the data are missing from PCS, then EDS excludes the corresponding NRPU value from the sum. As a result, the total NRPU will equal less than 12.

If the sum of the NRPU values is less than 12, EDS has two options for calculating the annual load. One option is to estimate discharges for the missing discharge data (EST=YES). Using this option, EDS normalizes the calculated annual load to 12 months per year using the sum of NRPU values. For example, if a pollutant is reported quarterly, but only three reported values are present in PCS, the NRPU sum will equal 9. EDS multiplies the sum of the three quarterly loads by 12/9 (12 months per year / Sum(NRPU)). So for example, if the sum of the three quarterly loads is 100 kg/yr, this sum is multiplied by 12/9 and the estimated annual load is 133 kg/yr.

If EST is not selected (EST = NO), EDS simply sums the loads calculated for each monitoring point. In the previous example, the estimated annual load is 100 kg/yr. For the current review, EPA selected the EST=YES option for its analysis of the 2002 PCS data. Section 2.3.2 discusses EPA's analysis of the EST options.

Parameter Grouping. An NPDES permit may require a facility to measure a pollutant in more than one way. For example, a facility may report both total lead and dissolved lead. Because total lead includes dissolved lead, adding the two measurements together overestimates the mass of lead discharged from the facility. To avoid double counting, EDS can group parameters that represent the same pollutant. The EDS grouping option uses a hierarchy to determine which parameter best represents the total pollutant discharge. For example, copper has six parameter codes: (1) dissolved copper, (2) suspended copper, (3) total copper, (4) total recoverable copper, (5) copper, and (6) potentially dissolved copper. Below is the "grouping" hierarchy for copper EDS uses if a facility reports multiple parameter codes:

- The data for total copper has precedence over the data for copper;
- If total copper is not reported, the data for copper has precedence over the data for total recoverable copper;
- If total copper and copper are not reported, the data for total recoverable copper has precedence over the data for potentially dissolved copper;
- If total copper, copper, and total recoverable copper are not reported the data for potentially dissolved copper has precedence over the data for either dissolved copper or suspended copper; and
- The data for dissolved copper are used to represent total copper in the absence of other copper parameters.

Attachment 2-A presents EPA's parameter grouping hierarchy for the *PCSLoads2002* database.

2.2.2.3 EDS Calculations and Assumptions

Facilities report pollutant mass quantities, pollutant concentrations, and wastewater flow rates to PCS using a variety of units. Before EDS uses PCS data to calculate loads, it converts the data into standard units of kilograms per day for mass quantities, milligrams per liter for concentrations, and millions of gallons per day for flow rates. This procedure is called the "convert module" and its output is a "convert file." After creating convert files, EDS uses the MLOC and Quantity/Concentration Hierarchies discussed in Sections 2.2.2.1 to select the appropriate monitoring location and measurement to use in calculating annual loads. Assuming that an outfall discharges continuously for 30 days per month, EDS calculates the monthly load using one of the following equations:

- Calculation of monthly load from daily load (MQAV or MQMX):

  Monthly Load (kg/mo) = Daily Load (kg/day) × 30 (days/mo)

- Calculation of monthly load from concentration and flow (MCAV, MCMX, or MCMN):

  Monthly Load (kg/mo) = Conc. (mg/L) × Flow (MGD) × 3.785 (L/gal) × 30 (days/mo)

EDS then adjusts the monthly load to represent quarterly, semiannual, or annual loads where appropriate by multiplying each monthly load by its NRPU value. For example, if a facility reported a 30-day average load of 25 kg/day for its required quarterly report (NRPU=3), EDS calculates the load for the quarter as 25 kg/day × 30 days/mo x 3 mo/qrt = 2,250 kg/qrt.

EDS calculates the annual pollutant load using user-specified DL and EST options. Using the BDL (below detection limit) indicator field, EDS identifies pollutants that were measured BDL. If the BDL indicator field contains a less-than sign (<), EDS calculates three loads by setting the monitoring period load to zero, one-half the period load, and equal to the period load. If the BDL indicator field is blank, then EDS uses the calculated period load. This step produces the three BDL options discussed in Section 2.3.1.

To calculate the EST=NO annual load, EDS sums the existing loads for each pipe-specific pollutant discharge as shown in the following equation:

$$(\text{EST=NO}) \text{ Annual Load (kg/yr)} = \text{Sum(Monthly Load} \times \text{NRPU)}$$

To calculate the EST=YES load, EDS sums the existing loads and sums the NRPU values for existing loads. In addition, EST=YES includes NRPU values for blank records that have a NODI code that indicates no discharge. Section 2.2.2.1 discusses the NODI codes that EDS excludes from estimation because they indicate that no discharge occurred for that month. The following equation calculates the EST=YES annual load:

$$(\text{EST=YES}) \text{ Annual Load (kg/yr)} = \text{Sum(Monthly Load} \times \text{NRPU)} \times (12/\text{Sum(NRPU))}$$

Using the two EST assumptions and the three BDL options, EDS produces the following six annual loads:

- KGY00: EST=NO, BDL = 0;
- KGYE0: EST=NO, BDL = ½ DL;
- KGY10: EST=NO and BDL = DL;
- KGY01: EST=YES and BDL = 0;
- KGYE1: EST=YES and BDL = ½ DL; and
- KGY11: EST=YES and BDL = DL.

This output is the starting point for EPA's data sensitivity analyses described in Section 2.3.

2.2.2.4 Limitations of EDS

EPA identified the following limitations for using the EDS system to calculate annual pollutant loads from monthly discharge data reported in PCS. EDS assumes that discharges occur continuously over the course of the monitoring period for which they are reported. Some discharges, however, occur intermittently, and are thus overestimated by EDS's assumption of a 24-hour-per-day, 30-day-per-month discharge. For example, the Dalecarlia Washington Aqueduct discharges wastewater intermittently for a few days throughout the year, not 30 days per month. EDS's assumption, therefore overestimates the discharges at this facility. EPA's quality review (Section 6) attempts to identify and correct overestimated loads.

Loadings are calculated for all monitored outfalls at a facility. However, a facility can have numerous monitoring points along an outfall route, where the same parameter might be monitored more than once. If monitoring locations are not clearly identified, EDS may double-count some parameter loads when summing a facility's data, which may overestimate the total pounds of parameter discharged at the facility. For example, if no data are available for MLOC 1 (effluent gross discharge) or 2 (effluent net discharge) for a pollutant, but data are available for MLOC A (after disinfection process) and B (prior to disinfection process), EDS sums the discharges for MLOC A and B. EPA believes that this may double count pollutant loads.

EDS cannot estimate loadings for all facilities and parameters in PCS because some data are not available or suitable. As a result, pollutant loading estimates generated by EDS may underestimate the actual total pollutant loadings from all facilities nationwide. For example, EDS encountered errors while processing DMR data for 2002 from facilities in Florida, Virginia, and Missouri, which prohibited EDS from calculating annual loads. EPA's resolution of this problem is discussed in Section 2.2.3.

2.2.3 *PCSLoadCalculator*

While attempting to use the EDS system to estimate the 2002 pollutant loadings for all facilities nationwide, EPA encountered a problem processing records for Florida, Virginia, and Missouri. In particular, EPA was unable to run the EDS program to estimate annual loads for missing DMR data in PCS. Because EPA was unable to address this problem through the EDS system, it developed a separate program, called the Load Calculator, to calculate loads for facilities in Florida, Virginia, and Missouri. EPA used the *PCSLoadCalculator* database to develop and evaluate its Load Calculator routine.

EPA used the annual load calculation methodology of the EDS program, described in Section 2.2.2, as the basis for the design of the Load Calculator routine. EPA attempted to replicate this methodology using Microsoft Access^{TM} queries. The following is a discussion of EPA's Load Calculator calculations and comparison to EDS output.

2.2.3.1 Load Calculator Calculations

EPA obtained PCS data that had been processed through the convert module. As described in Section 2.1.2.1, the convert module converts the reported loads, concentrations, and flows into standard units of kilograms per day (kg/day), milligrams per liter (mg/L), and MGD. In addition, EPA's mainframe computer analyst performed some data cleanup activities, such as moving the BDL indicators into separate fields and displaying the flow rates in fields adjacent to the pollutant mass quantities and concentrations. Table 2-4 presents the output that EPA used as a starting point for its loads calculations.

Table 2-4. Convert Module Output

PCS Field	Description
NPID	NPDES Number
SIC2	Standard Industrial Classification Code
DSCH	Discharge Pipe
DRID	Report Designator
NRPU	Number of Units in Reporting Period
PRAM	Parameter Code
MLOC	Monitoring Location
SEAN	Season Number
MODN	Modification Number
LIPQ	Limit Pipe Set Qualifier
STAT	Statistical Base Code
MVDT	Measurement/Violation Monitoring Period End Date
MVIO	Measurement/Violation Code
NODI	No Data Indicator
LMQAV	Measurement/Violation Quantity Average BDL Indicator
LMQMX	Measurement/Violation Quantity Maximum BDL Indicator
LMCMN	Measurement/Violation Concentration Minimum BDL Indicator

Table 2-4 (Continued)

PCS Field	Description
LMCAV	Measurement/Violation Concentration Average BDL Indicator
LMCMX	Measurement/Violation Concentration Maximum BDL Indicator
MQAV	Measurement/Violation Quantity Average
MQMX	Measurement/Violation Quantity Maximum
MCMN	Measurement/Violation Concentration Minimum
MCAV	Measurement/Violation Concentration Average
MCMX	Measurement/Violation Concentration Maximum
FMQAV	Measurement/Violation Quantity Average Flow
FMQMX	Measurement/Violation Quantity Maximum Flow
FMCMN	Measurement/Violation Concentration Minimum Flow
FMCAV	Measurement/Violation Concentration Average Flow
FMCMX	Measurement/Violation Concentration Maximum Flow

The Load Calculator performs the following functions:

1. Applies the MLOC and Quantity/Concentration Hierarchies discussed in Sections 2.2.2.1 to select the appropriate monitoring location and measurement;

2. Calculates the monthly load assuming a continuous discharge over 30 days;

3. Multiplies each monthly load by its corresponding NRPU value to adjust monthly loads to quarterly, semiannual, or annual loads where appropriate;

4. Calculates a load for each of the three BDL options described in Section 2.2.2.3;

5. Calculates EST=NO and EST=YES annual loads as described in Section 2.2.2.3; and

6. Applies the Hybrid DL method described in Section 2.3.1 to produce one EST=YES and one EST=NO load for each pipe-specific pollutant discharge.

Figure 2-4 presents a flow diagram for the calculations described above.

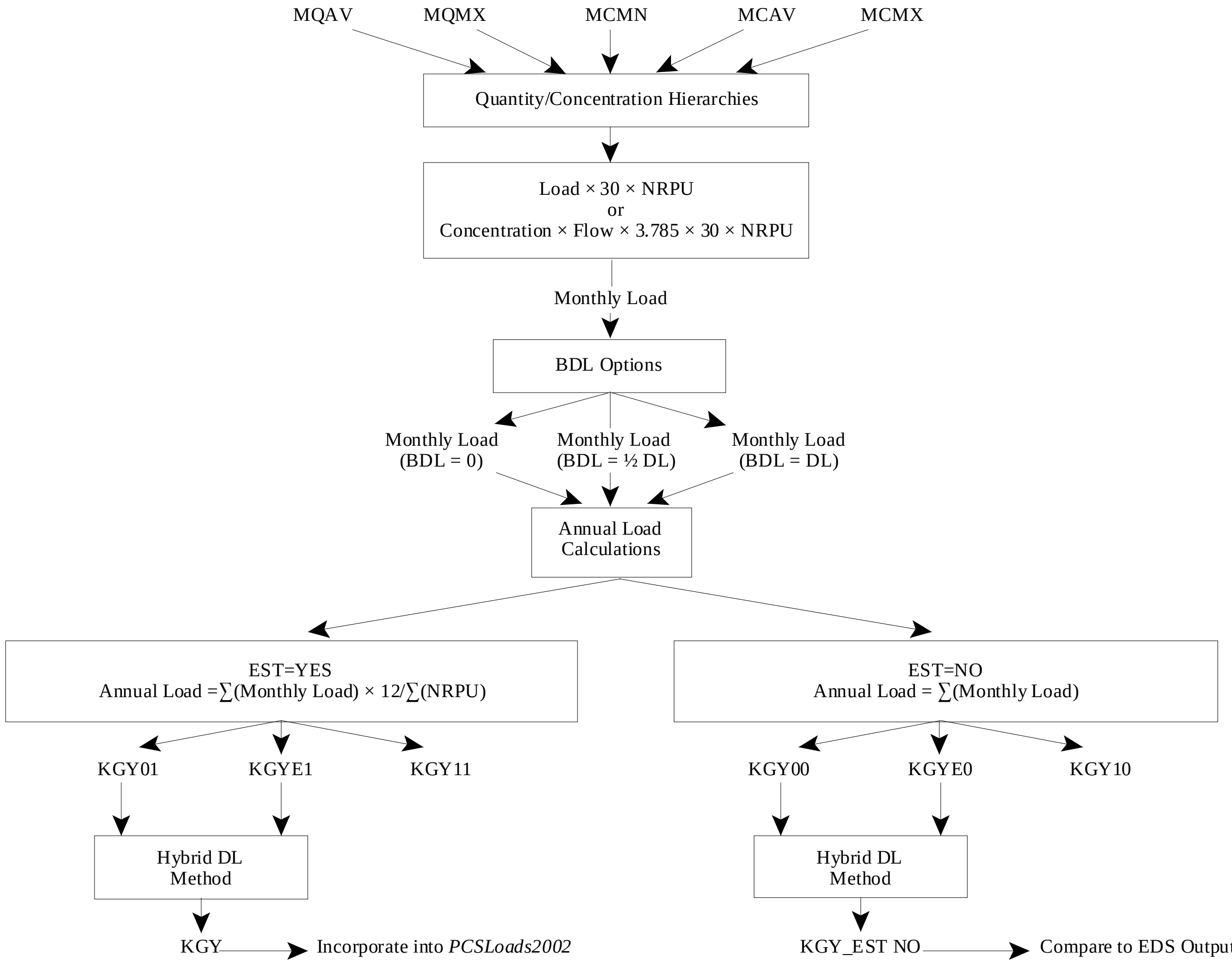

Figure 2-4. Flow Diagram for Annual Loads Calculations

2.2.3.2 Comparison of Load Calculator to EDS

As discussed in Section 2.2.1, EPA developed the *PCSLoadCalculator* to calculate EST=YES loads for facilities in Florida, Virginia, and Missouri. EPA obtained useable EST=NO load estimates from EDS for these facilities; however, the EST=YES run encountered errors that prohibited EDS from calculating loads. As a result, EPA used the loads calculations for the EST=NO runs to compare and validate results from the EDS system to the Load Calculator. For Florida, Virginia, and Missouri, EPA conducted a record-by-record comparison of the Load Calculator (EST=NO) output to EDS (EST=NO) output. As shown in Table 2-5, 84 percent of the loads calculated using the Load Calculator matched EDS by plus or minus 5 percent. Of these records, 53 percent matched EDS exactly.

Table 2-5. Comparison of Load Calculator Output for Florida, Virginia, and Missouri to EDS Output

Comparison	Exact Matches		Correct within + or - 5%		Poor Match (greater than 5% difference)		Total # of Records
	# of Records	%	# of Records	%	# of Records	%	
All Loads	5,510	53	8,778	84	1,648	16	10,426
Loads no POTWs (SIC 4952)	3,260	56	4,887	84	907	16	5,794
All TWPEs	861	29	2,164	73	782	27	2,946
TWPE w/o POTWs (SIC 4952)	572	33	1,273	74	455	26	1,728

Source: *PCSLoadCalculator* April 1, 2005 [3].

EPA evaluated how the failure of *PCSLoadCalculator* to exactly replicate EDS would affect the screening level analysis. Because the screening-level analysis is based on toxic-weighted discharges and focuses on industrial discharges (i.e., non-POTW discharges), EPA estimated TWPE for all reported discharges excluding discharges for SIC 4952 (Sewerage Systems). The total TWPE for non-POTW discharges calculated using the Load Calculator loads was 32.4 million pound-equivalents, and the TWPE calculated using EDS loads was 32.1 million pound-equivalents. The difference in total TWPE using the Load Calculator loads compared to EDS is less than one percent.

The point source categories with the largest differences in TWPE calculated using *PCSLoadCalculator* loads and EDS loads are Steam electric power generation, Organic chemicals, plastics, and synthetic fibers (OCPSF), Nonferrous metals manufacturing, and Phosphate manufacturing. None of these four categories had more than a 16 percent difference in TWPE calculated using *PCSLoadCalculator* loads and EDS loads. Attachment 2-B presents this comparison for all point source categories.

2.2.3.3 Conclusions

- EPA created the Load Calculator to address the problem of EDS providing incomplete data when the EST=YES option was used.

- EPA conducted a record-by-record comparison of the EST=NO loads generated by the *PCSLoadCalculator* to the EST=NO loads generated by EDS. This comparison showed that 84 percent (8,778 records) of the *PCSLoadCalculator* loads matched EDS within plus or minus 5 percent. Of these records, 5,510 matched EDS exactly.

- To determine the impact that the *PCSLoadCalculator* results would have on the screening-level analysis, EPA calculated the TWPE and omitted discharges from POTWs (SIC code 4952). The total TWPE for the *PCSLoadCalculator* loads was 32.4 million, which is less than one percent higher than the TWPE calculated for the EST=NO loads generated by EDS.

- EPA concludes that the use of *PCSLoadCalculator* loads for Florida, Virginia, and Missouri will not greatly impact the screening-level analysis of the 2002 PCS data. For any facility in Florida, Virginia, or Missouri that EPA identifies a major TWPE contributor during the detailed category reviews, EPA compares the facility's EDS loads to *PCSLoadCalculator* loads to verify the load calculation for that facility.

2.2.4 *PCSLoadsAnalysis2002*

The relationship between PCS, the EDS System, and EPA's three MS Access databases is depicted in Figure 2-1. *PCSLoadsAnalysis2002* is a PC-based database used to combine the annual loads data provided by EDS and the *PCSLoadCalculator* and streamline the data into one annual load per pollutant per pipe per facility. As described in Section 2.2.2 and 2.2.3, EDS and *PCSLoadCalculator* calculate six annual loads for each pollutant discharge. EPA streamlines the data by applying user-defined options selected by EPA based on the results of the sensitivity analyses discussed in Section 2.3. In addition, EPA uses the *PCSLoadsAnalysis2002* database to perform data cleanup activities and make corrections to downloaded PCS data.

EPA made the following modifications to the EDS and *PCSLoadCalculator* outputs:

- *Removal of influent data from loads*: PCS labels influent data as MLOC=G. EPA identified several records for influent data included in the EDS output. Including these data in the loads would result in overestimating wastewater discharges; therefore, EPA created a separate table in the *PCSLoadsAnalysis* database to store the influent data for possible future analysis.

- *Separation of flow from loads*: EDS output includes annual wastewater flow rates. The flow parameters are listed in the same field as the pollutant parameters; however, flow is in units of million gallons per year (MGY) and pollutant loads are in units of kilograms per year (kg/yr). To avoid confusion, EPA moved all flow data to a separate table in *PCSLoadsAnalysis*.

- *Parameter grouping hierarchy*: The parameter grouping option is described in Section 2.1.2.1 of this report. To avoid double-counting pollutants, EPA grouped pollutant parameters in the *PCSLoadsAnalysis* database that represent the same pollutant. EPA selected the load reported for the parameter that best represents the total load of pollutant and ignored loads for other parameters in the same group. Attachment 2-A presents the hierarchy used to group parameters for the same pollutant.

- *Data corrections identified in the analysis of the 2000 data:* During the 2004 screening-level analysis, EPA identified corrections for PCS data. Several of these corrections similarly apply to the 2002 data. In addition, EPA's quality review (Section 6.0) identified 142 other corrections to the 2002 PCS data, (e.g., units incorrectly reported to PCS as gallons per day were corrected to MGD). These corrections are listed in Attachment 2-C of this report.

2.2.4.1 Development of the "PCS2002" Table

Based on the results of the DL and EST sensitivity analyses described in Section 2.3, EPA decided to use the EST=YES option and the Hybrid DL Method to estimate 2002 annual loads. Using these two estimation methodologies, EPA condensed the six loads generated by EDS into one load per facility per pipe per pollutant. The "PCS2002" Table includes loads for all major dischargers and any available loads reported by minor dischargers to PCS for 2002. In addition, the table indicates records that are based on EST and/or DL.

2.3 Sensitivity Analyses

As explained in Section 2.2.2, the EDS system calculated annual loads six different ways. EPA evaluated these six results to determine how best to produce one load to represent 2002 discharges. EPA conducted two sensitivity analyses to determine the impact of the DL and estimation (EST) options on pollutant load calculations.

The following sections discuss the DL and EST sensitivity analyses. EPA obtained the data presented in Sections 2.3.1 and 2.3.2 from the version of the *PCSLoadsAnalysis2002* database dated April 1, 2005. As a result, the numbers presented in the following sections may not be consistent with the final results of the *PCSLoads2002* database presented in Section 2.4. However, the database version update will not change the results of these sensitivity analyses.

2.3.1 DL Sensitivity Analysis

When reporting to PCS, facilities must provide monitoring data for every pollutant that is limited in their NPDES permits, even pollutants never detected. A facility may report a pollutant as below detection limit (BDL) even if it is not expected to be present in the facility's wastewater. Approximately 16 percent of the loads in *PCSLoadsAnalysis2002* are BDL. EPA conducted the DL Sensitivity Analysis to determine how the BDL options should be used to most accurately account for pollutant discharges that are present in wastewater but measured BDL.

This subsection discusses the methods of using pollutant concentrations reported as BDL, and its impact on pollutant load calculations. As explained in Section 2.2.2.2, EDS calculates loads for a pollutant with a concentration reported BDL applying one of three numeric values:

1. Zero (BDL = 0);
2. The reported detection limit (BDL = DL); or
3. One half the reported detection limit (BDL = ½ DL).

BDL = 0. This method estimates a minimum load because it sets all pollutants reported below detection limit to zero, and does not attribute any load for pollutants that may be present in wastewater at less than measurable concentrations. The output from this method serves as a basis for comparison to the other BDL options.

BDL = ½ DL. This method attributes a load for all parameters that were measured BDL. For this reason, using BDL = ½ DL may overestimate pollutant loads.

Hybrid Approach. Under the hybrid approach, in some instances concentrations reported as below detection levels are treated as zero while in other instances they are treated as numeric values equivalent to ½ DL. When the pollutant at a particular outfall is always reported as BDL, EPA assumes the pollutant was not present. If however, the pollutant was ever measured above the detection level in any DMR for the year, EPA assumed the pollutant to be present at a concentration equivalent to ½ DL when it was reported BDL.

EPA identified and flagged BDL records in *PCSLoadsAnalysis2002* by comparing the annual load calculated using BDL = 0 to the load calculated using BDL = ½ DL. If a pollutant was ever measured BDL in 2002, then the annual load calculated using BDL = 0 would not equal BDL = ½ DL. If a pollutant was always measured above a detection level for 2002, then the annual load calculated using BDL = 0 would equal BDL = ½ DL. Out of the 229,931 records, EPA flagged 37,449 (16.3 percent) as "Based on DL."

Out of the "Based on DL" records, 20,891 (55.8 percent) were for pollutants that were never measured above the detection level in any DMR for the outfall for the year. The remaining 16,558 records (44.2 percent) were for pollutants measured above the detection level in the outfall at least once in 2002. The Hybrid Method, therefore, will set concentrations to greater than zero for only 16,558 of the flagged records (7 percent of all records in the database). In comparison, using BDL = ½ DL will set concentrations to greater than zero for all 37,449 flagged records.

EPA performed a sensitivity analysis to determine the effect of these various approaches for estimating BDL concentrations. This analysis is discussed below.

EPA calculated three annual loads for each pollutant using BDL = 0, BDL = ½ DL, and the Hybrid Method assumptions. Using EAD's TWFs, EPA calculated the TWPE for each estimated load. EPA summed the calculated TWPE by pollutant and point source category, and calculated a total TWPE for the *PCSLoadsAnalsyis2002* database. In each case, EPA determined the percentage of the TWPE that is based on one-half the detection limit using the following equation:

$$\% \text{ of TWPE Based on } \tfrac{1}{2} \text{ DL} = (TWPE_{1/2DL} - TWPE_{0DL}) / TWPE_{1/2DL}$$

The calculation is repeated substituting Hybrid TWPE for ½ DL TWPE.

As shown in Table 2-6, more than 99.99 percent of the TWPE calculated from BDL = ½ DL loads is driven by pollutant concentrations that represent one-half the detection limit and are not based on measured values. In comparison, only 1.6 percent of the TWPE calculated from Hybrid Method loads is driven by concentrations based on one-half the detection limit. This comparison demonstrates that, although only 16 percent of the loads in *PCSLoadsAnalysis2002* are calculated from pollutants measured BDL, the effect of the BDL assumption on total TWPE is significant.

Table 2-6. Comparison of Total TWPE for all PCS Reporters in 2002

Detection Limit Option	Total TWPE	% of Total TWPE Based on ½ DL
Option 1 (BDL = 0)	13.9 million	0
Option 3 (BDL = ½ DL)	5,392 billion	99.9997
Hybrid DL	14.1 million	1.61

Source: *PCSLoadsAnalysis2002* April 1, 2005 [3].

EPA's analyses at the point source category and pollutant levels produced similar results. The point source category-level analysis identified 14 categories where more than 50 percent of the total category TWPE calculated from BDL = ½ DL loads is driven by concentrations based on one-half the detection limit. Using the Hybrid Method, EPA identified 10 categories where more than 10 percent of the total category TWPE is driven by concentrations based on one-half the detection limit. No category TWPE was more than 35 percent based on concentrations set to one-half the detection limit. Table 2-7 presents the point source category-level comparison of BDL = 0, BDL = ½ DL, and the Hybrid Method for five categories. The total TWPE for these categories showed the highest sensitivity to the use of the three BDL options. Attachment 2-D presents the category rankings generated using the three BDL assumptions.

Table 2-7. Effect of BDL Assumption on Category TWPE for Five Categories

Point Source Category	BDL = 0 TWPE	BDL = ½ DL		Hybrid DL	
		TWPE	Amount of TWPE Based on ½ DL Assumption	TWPE	Amount of TWPE Based on ½ DL Assumption
Pulp, paper and paperboard (Phase II)	54,851	5,194 billion	5,194 billion (>99.9%)	55,232	381 (1%)
Pharmaceutical manufacturing	41,492	196 billion	196 billion (>99.9%)	50,457	8,964 (18%)
Steam electric power generation	1,538,076	2,166 million	2,164 million (>99.9%)	1,614,291	76,215 (5%)
Transportation by air	1,156	2,434,318	2,433,162 (>99.9%)	1,156	0 (0%)
Pulp, paper and paperboard (Phase III)	3,045	2,110,719	2,107,673 (>99.9%)	3,045	0 (0%)

Source: *PCSLoadsAnalysis2002* April 1, 2005 [3].

EPA also evaluated which pollutant parameters are most sensitive to changes in the BDL assumption. The BDL = ½ DL assumption calculated loads for 62 parameters that were never measured above the detection level in 2002. In addition, EPA identified 26 pollutants where more than 90 percent of the total pollutant TWPE is driven by concentrations based on one-half the detection limit. Using the Hybrid Method, EPA identified only 14 parameters where more than 50 percent of the total pollutant TWPE is driven by concentrations based on one-half the detection limit. The pollutant level comparison of BDL = 0, BDL = ½ DL, and the Hybrid Method is shown in Table 2-8 for four parameters. The total TWPE for these parameters showed the highest sensitivity to changes in BDL assumption.

Table 2-8. Effect of BDL Assumption on Four Pollutant Parameters

Parameter	BDL = 0 TWPE	BDL = ½ DL		Hybrid DL Method	
		TWPE	Amount of TWPE Based on ½ DL Assumption	TWPE	Amount of TWPE Based on ½ DL Assumption
Dioxin	1,657,637	5,198 billion	5,198 billion (>99.9%)	1,657,794	158 (0.01%)
2,3,7,8 TCDF	4,871	192 billion	192 billion (>99.9%)	4,871	0 (0%)
PCBs	171,661	2,165 million	2,164 million (>99.9)	177,516	5,855 (3%)
Benzidine	411	956,099	955,689	667	256 (38%)

Source: *PCSLoadsAnalysis2002* April 1, 2005 [3].

EPA's findings from the point source category and pollutant level analyses for each BDL option are summarized below.

BDL = ½ DL. In comparing BDL = 0 and BDL = ½ DL at the point source category level, EPA found that when using BDL = ½ DL, more than 50 percent of the total category TWPE was driven by concentrations based on one-half the detection limit for 14 categories. EPA also found that, when using BDL = ½ DL, more than 90 percent of the total pollutant TWPE based on concentrations set to one-half the detection limit for 88 parameters. Sixty-two of these parameters were never measured above the detection limit.

Hybrid Method. In comparing EPA's Hybrid Method to BDL = 0, EPA found that, when using the Hybrid Method, more than 10 percent of the total category TWPE is driven by concentrations based on one-half the detection limit for only 10 categories, and no category TWPE is more than 35 percent based on concentrations set to one-half the detection limit. EPA also found that, when using the Hybrid Method, only 14 pollutant TWPE are more than 50 percent based on concentrations set to one-half the detection limit. Since the Hybrid Method only assigns concentrations (and therefore loads) to pollutants that are detected at least once in the reporting year in a facility's wastewater, it significantly decreases the effect that the BDL assumption has on the total TWPE for point source categories, facilities, and pollutants.

Discussion/Conclusions

After evaluating these analyses, EPA selected the Hybrid Method to estimate the numerical concentration for pollutants reported below the detection level. EPA selected this method because it minimizes the effect of below detection level measurements while allowing for non-zero concentration estimates for pollutants most likely to be present in wastewater discharges.

2.3.2 EST Analysis

This section discusses the impact on pollutant load calculations of estimating discharges for periods where no data were reported. DMR data may be missing from PCS for the following reasons:

- Facility failed to submit required reports;
- Permitting authority received DMR but did not enter it into PCS;
- Data entry errors resulted in missing data, so period loads could not be calculated; or
- Facility did not submit a DMR because monitoring was optional for the monitoring period.

As discussed in Section 2.2.2.2, EDS has two options for calculating pollutant loads when data for certain periods are missing. The first option, EST=NO, sums the reported discharges to calculate the annual load (i.e., it assumes the pollutant was not discharged in the periods where the DMR was blank). The second option, EST=YES, calculates a discharge for the missing periods based on the discharges reported for other periods, and sums the estimated and reported discharges to calculate the annual load.

EPA performed a sensitivity analysis to determine the effect of estimating discharge loads for missing periods. This analysis is discussed below.

Comparison of EST Options

To compare the loads calculated with the two EST options, EPA ran EDS once using the assumption EST=YES and once using the assumption EST=NO[2]. EPA compared the calculated annual loads at the facility/pollutant/discharge pipe level to find records where EST=YES did not equal EST=NO, and set flags to identify loads based on estimated monthly discharges. Of the 229,931 records, EPA flagged 67,793 (29 percent) as "Based on EST".

Using the loads generated by EST=YES and EST=NO, EPA calculated two values for toxic weighted pound equivalents (TWPE), and summed the TWPEs at the pollutant, facility, and point source category levels, and for all of *PCSLoads2002*. EPA determined the percent of the total TWPE that is based on estimated monthly discharges using the following equation:

$$\% \text{ of TWPE Based on EST} = (TWPE_{YES\_EST} - TWPE_{NO\_EST})/TWPE_{YES\_EST}$$

As shown in Table 2-9, 4.1 million lb-eq, or 29 percent of the TWPE calculated for discharges reported by all major direct discharging facilities in PCS for 2002 are based on discharges that EDS estimated for periods where no data were reported.

Table 2-9. Comparison of Total TWPE for PCS 2002 Data

EST Option	TWPE (lb-eq)	% Based on Estimation
EST = NO	9.91 million	0
EST = YES	14.0 million	29

Source: *PCSLoadsAnalysis2002* April 1, 2005 [3].

EPA conducted this same analysis at the point source category level. Seven point source categories account for 4.0 million of the 4.1 million lb-eq (more than 95%) calculated from estimated discharges. Attachment 2-E presents the category rankings generated using each of the EST options. Table 2-10 compares the EST=YES and EST=NO TWPE for the seven

[2]The analysis was performed without data for facilities in Florida, Missouri, or Virginia.

categories that contribute 95 percent of the pound equivalents calculated from estimated discharges.

Table 2-10. Categories Contributing 95 Percent of the TWPE that is Based on Estimation

40 CFR Part	Point Source Category	Major Facilities	EST=NO TWPE	EST=YES TWPE	Amount of TWPE Based on Estimation	% of Total Estimated TWPE in *PCSLoads2002*
454	Gum and wood chemicals	5	991,133	3,819,669	2,828,537	69
430.1	Pulp, paper and paperboard (Phase I)	78	1,120,251	1,575,172	454,921	11
423	Steam electric power generation	554	1,401,640	1,614,291	212,652	5.2
414	Organic chemicals, plastics and synthetic fibers	240	413,151	620,884	207,733	5.1
407	Fruits and vegetable processing	25	233,835	342,160	108,325	2.6
433	Metal Finishing	122	431,972	510,503	78,531	1.9
421	Nonferrous metals manufacturing	53	402,863	450,525	47,662	1.2
	Total		**9,905,882**	**14,013,031**	**4,107,150**	

Source: *PCSLoadsAnalysis2002* April 1, 2005 [3].

For the seven categories listed in Table 2-10, EPA analyzed facility and pollutant data to determine the cause of the difference in the TWPE calculated when EST=YES and EST=NO. In general, one of the following two cases contributed to the majority of the difference in TWPEs for each category:

1. The load of a single pollutant reported by a single facility accounts for the majority of the estimated discharges; or

2. No single pollutant or facility accounts for the majority of estimated discharges.

These cases are discussed below.

Single Pollutant Discharged by One Facility

An example of a category where the majority of the difference in TWPE using the two EST options is driven by a single pollutant reported by one facility is the Gum and Wood Chemicals category. For this category, 2.8 million pound equivalents (74 percent of the total TWPE) is based on estimated monthly discharges. Toxaphene discharges from one facility in Georgia account for more than 99.9 percent of the TWPE based on estimated monthly discharges for this category.

EPA identified five other categories where the majority of the difference in EST=YES and EST=NO TWPE was driven by single pollutant discharge reported by one facility. These categories are listed in Table 2-11. After subtracting the TWPE for the six discharges shown in Table 2-11, the total PCS TWPE that is based on estimated discharges for missing monthly reports was reduced from 4.1 million lb-eq to 560,324 lb-eq (In other words, subtracting the TWPE for these six discharges reduces the TWPE based on estimates from 29 to 6.8 percent of the total PCS TWPE).

Table 2-11. Pollutants and Facilities Contributing the Majority of the TWPE Based on Estimated Discharges by Category

Point Source Category or SIC Group	TWPE Based on Estimated Monthly Discharges	Pollutant Discharge Contributing the Majority of TWPE Based on Estimation	Amount of TWPE Based on EST After Removing Single Pollutant
Gum and Wood Chemicals	2,828,537	Toxaphene (GA0003735)	7.38
Pulp, Paper, and Paperboard Phase I	454,921	Dioxin (SC0001015)	113,252
Organic Chemicals, Plastics, and Synthetic Fibers	207,733	Dioxin (OH0007269)	29,109
Fruits and Vegetable Processing	108,325	Sulfide (PR0000591)	3,668
Metal Finishing	78,531	PCBs (IN0053384)	17,117
Nonferrous Metals Manufacturing	47,662	Molybdenum (LA0110931)	15,730
Total	**4,107,150**		**560,324**

Source: *PCSLoadsAnalysis2002* April 1, 2005 [3].

Widespread Estimation

Of the seven categories with the highest loads based on EST, Steam Electric Power Generation was the only category for which EPA could not identify a single pollutant or facility that was driving the difference in EST=YES and EST=NO TWPE. For this category, 28 facilities and nine pollutants contribute 95 percent of the TWPE estimated for missing monthly data.

Conclusions

- In its analysis of the EST assumption, EPA did not identify any category where the estimation assumption was used for most facilities. For 6 out of the 7 categories that account for more than 95 percent of the difference between the EST=YES and EST=NO TWPE, EPA identified a single pollutant at one facility driving the difference. Steam Electric Power Generation was the only category, for which EPA did not identify a single facility responsible for the estimated TWPE.

- The EST analysis demonstrated that, with the exception of six anomalies, the PCS TWPE is not driven by estimated discharges for missing monthly data. After removing the TWPE for a single pollutant discharge reported by one facility in six categories, only 6.8 percent of the total PCS TWPE is based on estimated discharges.

- Estimating discharges for missing monthly data in PCS helps to avoid underestimating pollutant loads without driving the results of the screening-level analysis. EPA, therefore used the EST=YES option to calculate annual loads from monthly discharge data reported to PCS.

- During quality review (Section 6.0), EPA investigated three of the six facilities in categories with high estimated TWPE, and determined that the estimated loads are appropriate to include in the analysis. Furthermore, during any future category-specific analyses, the “Based on EST” flags in the *PCS Loads 2002* database will be reviewed to understand the impact of estimated pollutant loads on the total category discharges.

2.4 Results of the *PCSLoads2002* Database

This section presents the results of the *PCSLoads2002* database. Table 2-12 presents the categories ranked from highest to lowest TWPE. Attachment 1-A presents the four-digit SIC code rankings by TWPE. Attachment 1-B presents the total TWPE for pollutant parameters reported in PCS.

Table 2-12. Point Source Category Rankings by TWPE

40 CFR Part[1]	Point Source Category	Majors	Minors	Total Pounds	TWPE (lb-eq)
454	Gum and wood chemicals	5	5	10,947,231	3,819,669
414	Organic chemicals, plastics and synthetic fibers	238	206	1,053,253,208	1,711,001
423	Steam electric power generation	556	308	19,579,456,120	1,619,805
430	Pulp, paper and paperboard	251	39	4,318,859,520	1,520,479
420	Iron and steel manufacturing	105	66	2,197,019,071	1,421,855
422	Phosphate manufacturing	13	9	171,387,336	1,276,142
433	Metal Finishing	122	617	105,370,142	510,503
421	Nonferrous metals manufacturing	56	25	206,952,208	450,525
414.1	Vinyl Chloride and Chlor-Alkali	42	7	1,914,130,368	432,928
440	Ore mining and dressing	73	37	625,769,753	406,548
407	Fruits and vegetable processing	25	103	172,282,986	342,160
463	Plastic molding and forming	9	116	214,533,873	172,483
419	Petroleum refining	112	487	1,116,592,524	165,721
418	Fertilizer manufacturing	25	22	540,486,798	143,795
415	Inorganic chemicals	68	127	1,258,006,644	139,682
410	Textile mills	74	46	77,497,564	124,085
432	Meat and Poultry Products	46	133	76,782,420	64,154
436	Mineral Mining and Processing	34	469	971,375,695	60,106
445	Landfills/Waste Combustors	19	242	76,272,682	58,808
455	Pesticide chemicals manufacturing	203	23	122,209,015	50,690
439	Pharmaceutical manufacturing	34	41	114,348,951	50,457
467	Aluminum forming	13	25	13,478,837	19,841
413	Electroplating	30	40	5,254,030	19,482
409	Sugar processing	24	7	109,631,933	16,575
457	Explosives	6	9	49,010,659	14,452

Table 2-12 (Continued)

40 CFR Part[1]	Point Source Category	Majors	Minors	Total Pounds	TWPE (lb-eq)
464	Metal molding and casting (foundries)	7	52	731,907	9,886
424	Ferroalloy manufacturing	3	4	9,572,794	6,652
471	Nonferrous metals forming and metal powders	15	28	2,561,129	5,763
469	Electrical and electronic components	6	10	7,767,393	5,070
425	Leather tanning and finishing	7	1	735,989	3,785
468	Copper forming	8	17	2,111,038	3,550
466	Porcelain Enameling	14	42	22,751,222	3,478
437	Centralized Waste Treaters	3		81,219,330	3,429
428	Rubber Manufacturing	20	98	9,530,447	2,386
411	Cement manufacturing	5	41	39,796,182	2,107
408	Canned and preserved seafood	7	68	285,689,423	991
429	Timber products processing	8	138	11,736,504	915
406	Grain mills manufacturing	12	22	6,531,899	787
438	Metal Products and Machinery	23	61	1,621,606	724
434	Coal mining	14	94	23,957,831	671
443	Paving and roofing materials (tars and asphalt)	4	64	287,252	565
451	Aquatic Animal Production Industry	2	18	3,703,974	304
417	Soaps and detergents manufacturing	2	7	381,096	258
461	Battery manufacturing	1	5	16,769	88
405	Dairy products processing	4	72	439,265	45
460	Hospital and Other Healthcare	2	27	9,760	6.2
435	Oil & Gas Extraction	2	85	1,436,488	1.2
412	CAFO	1	72	228,663	0

Source: *PCSLoads2002_v02*. [4]

[1]414.1 refers to the VCCA segment of 414 & C-A segment of 415.

2.5 References

1. U.S. EPA. 2001d. *Permit Compliance System Generalized Retrieval Training Manual*. DCN 00357

2. U.S. EPA. 1997. *Guidance and Standards for Calculating Point Source Loads Using the Permit Compliance System (PCS)*. Available online at <http://www.epa.gov/owmitnet/pcsguide.htm>. DCN 02307.

3. U.S. EPA. 2005. *April 1, 2005 versions of the PCSLoads2002_v01, PCSLoadsAnalysis2002, PCSLoadCalculator Databases*. DCN 02303.

4. U.S. EPA. 2005. *PCSLoads2002_v02* Database. DCN 02299.

3.0 DEVELOPMENT OF *TRIRELEASES2002*

As previously stated in Section 2, the Clean Water Act requires EPA to annually review promulgated effluent guidelines and pretreatment standards. After identifying and considering a number of sources of data, EPA used data reported to the Toxics Release Inventory (TRI) to estimate the mass of pollutants discharged by industry categories. EPA estimated the toxicity of these discharges using toxic weighting factors (TWF) to calculated an estimate of toxic-weighted pound equivalents (TWPE). As discussed in Section 7, EPA summed the TWPE calculated from the TRI data and PCS data (see Section 2). EPA used this summed TWPE to prioritize its review of industry sectors that appeared to offer the greatest potential for reducing hazard to human health or the environment.

This section discusses how *TRIReleases2002* was created. It also presents the output for all facilities reporting discharges to TRI for the year 2002 and for the point source categories that these facilities represent. Attachment 1 presents the *TRIReleases2002* output on a four-digit SIC code and chemical basis. This section is organized in the following subsections:

- Section 3.1 discusses TRI in general;
- Section 3.2 gives an overview of the TRI databases;
- Section 3.3 describes the development of *TRIRawData2002*;
- Section 3.4 describes the development of *TRICalculations2002*;
- Section 3.5 describes the development of *TRIReleases2002*; and
- Section 3.6 presents preliminary results from *TRIReleases2002*.

3.1 TRI

TRI is the common name for Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). Each year, facilities that meet certain criteria must report their releases and other waste management activities for listed toxic chemicals (i.e., the quantities of toxic chemicals recycled, collected and combusted for energy recovery, treated for destruction, or disposed of by the facility). A separate report must be filed for each chemical that exceeds the reporting threshold. The TRI list of chemicals for reporting year 2002 includes more than 600 chemicals and chemical categories. For the 2005 annual review of effluent guidelines, EPA used data for reporting year 2002, because they were the most recent data available at the time the review began.

A facility must submit a TRI report if it meets the following three criteria:

(1) *SIC Code Determination*: Facilities in SIC codes 20 through 39, seven additional SIC codes outside this range, and federal facilities are potentially subject to TRI reporting. EPA generally relies on facility claims regarding the SIC code identification. The primary SIC code determines if TRI reporting is required. The primary SIC code is associated with the facility's revenues, and may not relate to their pollutant discharges.

(2) *Number of Employees*: Facilities must have 10 or more full-time employees or their equivalent. EPA defines a "full-time equivalent" as a person who works 2,000 hours in the reporting year (there are several exceptions and special circumstances that are well defined in the TRI reporting instructions).

(3) *Activity Thresholds*: If the facility is in a covered SIC code and has 10 or more full-time employee equivalents, it must conduct an activity threshold analysis for every chemical and chemical category on the current TRI list. The facility must determine whether it manufactures, processes, or otherwise uses each chemical at or above the appropriate activity threshold. Reporting thresholds are <u>not</u> based on the amount of release. All TRI thresholds are based on mass, not concentration. Different thresholds apply for persistent bioaccumulative toxic (PBT) chemicals than for non-PBT chemicals.

In TRI, facilities report annual loads released to the environment of each toxic chemical or chemical category that meets reporting requirements. TRI requires facilities to report on-site releases to air, receiving streams, disposal to land, underground wells, and several other categories. Facilities must also report the amount of toxic chemicals in wastes transferred to off-site locations, including discharges to publicly owned treatment works (POTWs) and other off-site locations, such as commercial waste disposal facilities.

For this review, EPA focused on facility reports of chemical discharges directly to a receiving stream or transfers to a POTW. For discharges directly to a stream (direct discharges), EPA took the annual loads directly from the reported TRI data for calendar year 2002. For transfers of chemicals to POTWs (indirect discharges), EPA first adjusted the TRI pollutant loads to account for pollutant removal at the POTW prior to discharge to the receiving stream (see Section 3.4.2 for more details).

TRI does not require facilities to sample and analyze wastestreams to determine the quantities of toxic chemicals released. Facilities may estimate releases based on mass balance calculations, published emission factors, site-specific emission factors, or other approaches. Facilities must indicate the basis of their release estimate using a reporting code. According to TRI's reporting guidance, facilities should use one-half the detection limit to estimate mass releases of chemicals that are measured below their detection limit and are reasonably expected to be present. Nondetects of dioxin and dioxin-like compounds, however, may be reported as zero.

TRI allows facilities to report releases as specific numbers or as ranges, if appropriate. Specific estimates are encouraged if data are available to ensure the accuracy; however, EPA allows facilities to report releases in the following ranges: 1 to 10 pounds, 11 to 499 pounds, and 500 to 999 pounds. For this review, if a facility reported releases in a range, EPA used the mid-point of each reported range to represent a facility's releases.

3.1.1 Utility of TRI

The data collected in TRI are particularly useful for the 304(m) review process for the following reasons:

- TRI includes data from all 50 states and U.S. territories;
- TRI includes releases to POTWs, not just direct discharges;
- TRI includes discharge data from manufacturing SIC codes and some other industrial categories; and

- TRI includes releases of many chemicals, not just those already identified as problems and limited in facility discharge permits.

3.1.2 Constraints and Limitations of TRI

TRI provides comprehensive data for direct and indirect discharging facilities. However, EPA identified the following constraints and limitations to using TRI for the screening-level analysis:

- Small establishments (less than 10 employees) are not required to report, nor are facilities that don't meet the reporting thresholds. Thus, facilities reporting to TRI may be a very small subset of an industry.

- Release reports are, in part, based on estimates, not measurements, which may result in inaccurately reported releases. For example, TRI encourages facilities to report some compounds as present at one-half the detection level if a facility suspects that the compound has the potential to be present, even if measured data show the compound is below its detection level. As a result, many companies are conservative and adopt this approach. For facilities with large flows, this can result in large estimates of pounds or toxic pounds of pollutant released with no data to support that the compound was ever present above the detection level.

- Certain chemicals (polycyclic aromatic compounds, dioxin and dioxin-like compounds, metal compounds) are reported as a class, not as individual compounds. Because the individual compounds in the class have widely varying toxic effects, the potential toxicity of chemical releases can be inaccurately estimated.

- Facilities are identified by SIC code, not point source category. For some SIC codes, it may be difficult or impossible to identify the point source category that is the source of the toxic wastewater releases.

- The list of chemicals covered by TRI is not all-inclusive and changes over time.

- Facilities in only certain SIC codes are required to report; therefore, some sources of water pollutant discharges are not included.

- For the many chemicals with high reporting thresholds, a facility is not required to report these releases unless they exceed the high threshold.

- Information in TRI does not represent national estimates because not all facilities are required to report to TRI.

Despite the limitations and constraints of data in TRI, EPA has determined that the data are appropriate for an initial screening-level review and prioritization of the pollutant loadings discharged by industrial categories. EPA will further evaluate the prioritized categories in a second level of review which may include additional data collection and verification of data reported in TRI.

3.2 Overview of TRI Databases

EPA developed the end-user database in three steps:

- Step 1: Downloaded relevant data from TRI to create *TRIRawData2002* (see Section 3.3).
- Step 2: Estimated toxicity of discharges, set up groupings of facilities (by SIC code and discharge type), and made corrections and adjustments to create *TRICalculations2002* (see Section 3.4).
- Step 3: Grouped the pollutant discharges in *TRICalculations2002* by SIC code, point source category, and other groupings to create *TRIReleases2002* for rankings and other analyses.

Figure 3-1 shows how these three databases are related.

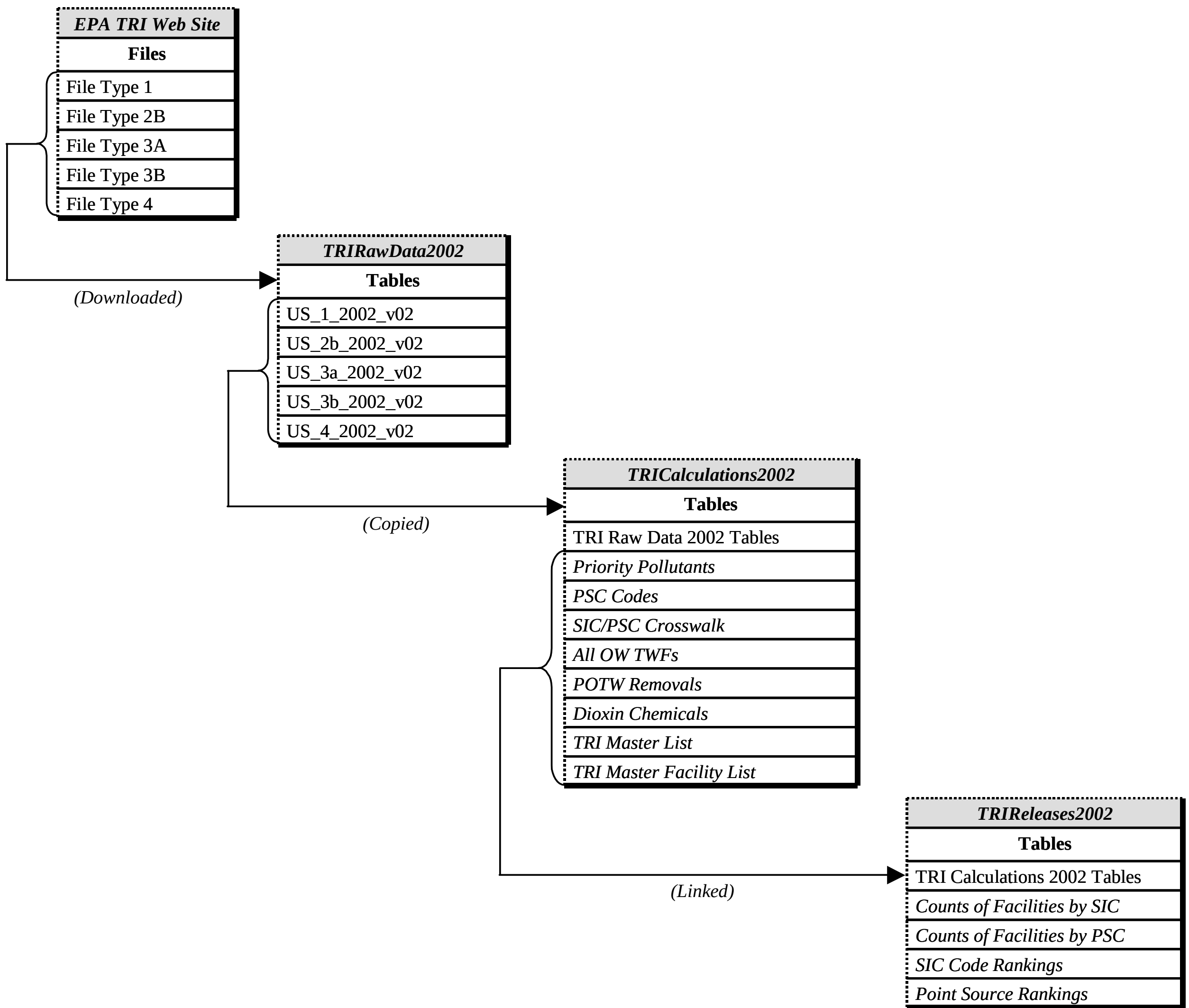

Figure 3-1. Relationship Between the Three TRI 2002 Databases

3.3 *TRIRawData2002*

EPA created *TRIRawData2002* by downloading the 2002 TRI data for all of the United States from the EPA web site (www.epa.gov/tri). Table 3-1 lists the relevant TRI 2002 files that EPA imported into the Microsoft Access™ database.

Table 3-1. TRI 2002 Tables Downloaded from EPA

Table Name	Description of File Contents
File Type 1: Facility, Chemical, Releases and Other Waste Management Summary Information	Facility information (Part I on Form R and Form A), as well as most chemical information (Part II on Form R and Form A). Data elements are reported individually. The information is also disaggregated based on Waste Management code (i.e., Management "M" code reported on TRI Form R), and aggregated up to On-site Releases, Off-site Releases, Other On-site Waste Management, and Transfers Off Site for Further Waste Management categories.
File Type 2B: Detailed On-Site Waste Treatment Methods and Efficiency	Facility information (Part I on Form R and Form A) and On-site Waste Treatment Methods and Efficiency data (Part II, Section 7A on Form R).
File Type 3A: Details of Transfers Off Site	Facility information (Part I on Form R and Form A) as well as details of individual transfers off-site (Part II, Section 6.2 on Form R).
File Type 3B: Details of Transfers to POTW	Facility information (Part I on Form R and Form A) as well as a list of POTWs (Part II, Section 6.1.B on Form R).
File Type 4: Details of Facility Information	Facility information (Part I on Form R and Form A) for all facilities that have ever reported to the TRI program. The "reporting year" field at the beginning of each record identifies the last year the facility reported to the TRI program.

Source: http://www.epa.gov/tri/tridata/tri02/data/index.htm.

3.4 *TRICalculations2002*

As the second step in developing *TRIReleases2002*, EPA created *TRICalculations2002* by copying raw data tables from *TRIRawData2002*, omitting unrelated data (e.g., air emissions and source reduction activities), and performing the following actions:

- Corrected SIC code classification for certain facilities and chemicals and corrected certain reported chemical quantities (Section 3.4.1);
- Estimated POTW removals for indirect discharges (Section 3.4.2);
- Estimated the mass-based and toxic-equivalent pollutant loadings (Section 3.4.3);

- Combined releases of parent metals and their associated compounds (Section 3.4.4);

- Created table of surface water discharges attributed to stormwater (Section 3.4.5); and

- Determined basis of TRI release and transfer estimates (Section 3.4.6).

To perform the calculations listed above, EPA imported tables containing CAS numbers, TWFs, and POTW removal rates. Table 3-2 lists the database tables that EPA imported or created in *TRICalculations2002*.

Table 3-2. Tables Imported or Created in *TRICalculations2002*

Table Name	Created or Imported?	Description
TRI Raw Data 2002 Tables	Imported from *TRIRawData2002*	Copy of all original TRI tables stored in the *TRIRawData2002* database and deleted information not needed for the 2005 Annual Review.
Priority Pollutants	Imported from *TRIReleases2000*	List of priority pollutants (CAS No. and chemical name).
Point Source Category Codes	Imported from *TRIReleases2000*	Point Source Categories and corresponding Point Source Category codes.
SIC/Point Source Category Crosswalk	Imported from *TRIReleases2000* and updated	Cross-references relating SIC codes and Point Source Category codes. *TRIReleases2000* table includes corrections and adjustments identified during the 2004 annual review. The table was updated for the 2005 annual review when additional adjustments were identified.
TWFs	Created	TWF information for chemicals based on the Office of Water references. EPA created this table using TWFs as of December 2004.
Dioxin Chemicals	Created	List of the 17 dioxin congeners and the TRI congener number associated with each for the dioxin distribution.
POTW Removals	Created	Lists all 612 TRI chemicals and chemical compounds and their chemical-specific average POTW percent removal. See "POTW Percent Removals Used for the *TRIReleases2002* Database" [1].
TRI Master List	Created using queries	Calculated TWPE for every chemical released by every facility reporting to TRI 2002. EPA developed this table using data from *TRIRawData2002* and TWF tables.
TRI Master Facility List	Created using queries	Complete and unique list of all facilities reporting to TRI, relevant facility information (address, contacts, etc.), and corresponding primary SIC codes. EPA developed this table using data from *TRIRawData2002*.

3.4.1 Modifications to TRI-Reported Data

Modifications to TRI-Reported data include SIC code classification corrections and facility-specific load changes. During the previous screening-level review of the 2000 data, EPA made corrections to *TRIReleases2000* based on information received from industry. The SIC code corrections identified for the 2000 data were similarly applied to the 2002 data, as appropriate. In addition, EPA conducted a quality review of the *TRIReleases2002* database (described in Section 6.0). As a result of this review, EPA made 126 corrections to the 2002 releases. Attachment 3-A lists the corrections EPA made to the *TRIReleases2002* database.

EPA assigned pollutant loadings to point source categories based on the primary SIC code that facilities reported. A facility reports up to six SIC codes to TRI and specifies one primary SIC code. In cases where EPA was able to identify that chemical releases to surface water or a POTW were related to activities covered by a different SIC code, EPA corrected the SIC code assigned to the facility and/or chemical. For example, a facility may report their primary SIC code as 2869, Chemical Manufacturing, not otherwise specified. The facility may also perform pesticide manufacturing, which is covered under SIC code 2879, Pesticide Manufacturing. If this facility reported a pesticide release, EPA assigned the pesticide release to the Pesticide Chemicals Category, because these pollutant discharges are regulated under the Pesticide Chemicals Point Source Category, not the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category. Section 5 in this report provides a detailed discussion of the development of the SIC/Point Source Category Crosswalk.

3.4.2 POTW Removals

For facilities that reported transfers of chemicals to POTWs, EPA first adjusted the TRI pollutant loads reported to be transferred to POTWs to account for pollutant removal that occurs at the POTW prior to discharge to the receiving stream. For indirect dischargers, EPA estimated the pounds of facilities’ waste released to the surface water after POTW removal using the following equation:

Release to Stream (lbs/yr) = [Transfer to POTW (lbs/yr)] × [1- POTW Removal (%)]

The *TRIReleases2002* database uses POTW removals using the hierarchy described in the memorandum entitled "POTW Percent Removals Used for the *TRIReleases2002* Database" [1]. In short, EPA used removal efficiencies from the following data sources, listed in order of preference:

- Recent effluent guidelines rulemakings;
- EPA/ORD's National Risk Management and Research Laboratories (NRMRL) treatability database; and
- EPA/OPPTS' Risk Screening Environmental Indicators (RSEI) model.

Attachment 3-B lists the POTW Removals and their data sources, in alphabetical order.

3.4.3 TWFs

EPA used the "TWFs" table, which lists TWFs by CAS number, in *TRICalculations2002* to calculate toxic weighted pound-equivalents (TWPE) for chemical discharges. If the table did not list a TWF for a specific parameter, EPA did not include pollutant discharges for this chemical in its TWPE estimates. Section 4.0 describes TWFs in more detail.

In some cases, EPA calculated industry-specific TWFs for certain chemical compound categories. EPA created specific TWFs when it had additional information about the composition of the compound category, as released from specific industries. Table 3-3 lists the calculated TWFs. The remainder of this subsection describes how EPA developed the TWFs, in the following order:

- Dioxins;
- Creosote for all categories;
- Wood Preserving Creosote;

- Polycyclic Aromatic Compounds (PACs) for all categories;
- Petroleum Refining PACs;
- Wood Preserving PACs; and
- Pulp, Paper, and Paperboard PACs.

Table 3-3. TWF Modifications

Chemical	SIC Code	TWF
Dioxins	All	Apply individual dioxin compound TWF using facility-specific or SIC-code-average dioxin congener distribution.
Creosote	All	1.35
PACs	All SIC codes, except 2911, 5171, 2491, 2611, 2621, 2631	100.66
PACs	SIC code 2911 and 5171: Petroleum Refining	26.28
PACs	SIC code 2491: Wood Preserving	8.36
PACs	SIC code 2611, 2621, 2631: Pulp, Paper, and Paperboard	34.21

Dioxins

The term ‘dioxins’ refers to polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs), which constitute a group of PBT chemicals. There are 17 CDDs and CDFs congeners with chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings, the most toxic of which is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The 17 compounds (called congeners) are referred to as ‘dioxin-like,’ because they have similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses [2], though the toxicity of the congeners varies greatly. In this report, EPA uses the term “dioxins” to refer to all 17 of the 2,3,7,8-substituted CDDs and CDFs.

EPA developed TWFs for each of the 17 dioxin congeners, ranging from 703,584,000 for 2,3,7,8-TCDD to 2,021 for Octachlorodibenzofuran. Due to their toxicity and ability to bioaccumulate, the various congeners of dioxin have high TWFs relative to most chemicals. Consequently, even small mass amounts of dioxin discharges translate into high TWPEs. Table 3-4 presents the dioxin TWFs used in the screening-level analysis.

Table 3-4. Dioxins and Their Toxic Weighting Factors

CAS Number	Chemical Name	Abbreviated Name	Toxic Weighting Factor
	CDDs		
1746-01-6	2,3,7,8-tetrachlorodibenzo-p-dioxin	2,3,7,8-TCDD	703,584,000
40321-76-4	1,2,3,7,8-pentachlorodibenzo-p-dioxin	1,2,3,7,8-PeCDD	692,928,000
39227-28-6	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	1,2,3,4,7,8-HxCDD	23,498,240
57653-85-7	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	1,2,3,6,7,8-HxCDD	9,556,480
19408-74-3	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	1,2,3,7,8,9-HxCDD	10,595,840
35822-46-9	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	1,2,3,4,6,7,8-HpCDD	411,136
3268-87-9	1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin	1,2,3,4,6,7,8,9-OCDD	6,586
	CDFs		
51207-31-9	2,3,7,8-tetrachlorodibenzofuran	2,3,7,8-TCDF	43,819,554
57117-41-6	1,2,3,7,8-pentachlorodibenzofuran	1,2,3,7,8-PeCDF	7,632,640
57117-31-4	2,3,4,7,8-pentachlorodibenzofuran	2,3,4,7,8-PeCDF	557,312,000
70648-26-9	1,2,3,4,7,8-hexachlorodibenzofuran	1,2,3,4,7,8-HxCDF	5,760,000
57117-44-9	1,2,3,6,7,8-hexachlorodibenzofuran	1,2,3,6,7,8-HxCDF	14,109,440
72918-21-9	1,2,3,7,8,9-hexachlorodibenzofuran	1,2,3,7,8,9-HxCDF	47,308,800
60851-34-5	2,3,4,6,7,8-hexachlorodibenzofuran	2,3,4,6,7,8-HxCDF	51,204,160
67562-39-4	1,2,3,4,6,7,8-heptachlorodibenzofuran	1,2,3,4,6,7,8-HpCDF	85,760
55673-89-7	1,2,3,4,7,8,9-heptachlorodibenzofuran	1,2,3,4,7,8,9-HpCDF	3,033,984
39001-02-0	1,2,3,4,6,7,8,9-octachlorodibenzofuran	1,2,3,4,6,7,8,9-OCDF	2,021

Beginning with reporting year 2000, facilities meeting certain reporting criteria were required to report to TRI the total mass, in grams, of the 17 dioxin and dioxin-like compounds released to the environment every year. This reporting method does not account for the relative toxicities of the 17 compounds. However, reporting facilities are given the opportunity to report a facility-specific congener distribution. Yet even if dioxins are released to more than one medium, the facility can report only one distribution. EPA cannot know if the single dioxin congener distribution reported by a facility accurately reflects the dioxin distribution in wastewater. Nevertheless, it is the best available information and EPA uses it to calculate the reporting facility's dioxin TWPE.

To account for the relative toxicities of the different dioxin congeners, EPA first converted the reported dioxin releases from grams to pounds because the TWPE is associated with pounds and not grams. EPA then calculated dioxin TWPE estimates using the facility-specific congener distributions for all facilities that reported a distribution. Based on information provided by the facilities, EPA made corrections to the reported dioxin distributions for three facilities: DuPont (New Johnsonville, TN), DuPont (EdgeMoor, DE), and Bowater (Catawba, SC). The DuPont facilities manufacture titanium dioxide, while the Bowater mill makes bleached papergrade kraft pulp. EPA corrected the dioxin distributions for the DuPont facilities because they provided effluent monitoring data and explained how they used ½ the detection limit for "non-detects" to determine the distribution. EPA corrected the dioxin distribution for Bowater Catawba because the facility provided EPA with its measured dioxin effluent data, and the TRI-reported distribution did not match the provided data.

EPA received changes to TRI-reported dioxin discharges from two wood preserving facilities. EPA has not yet incorporated these changes into *TRIReleases2002* because it is expecting to receive changes from a third facility.

EPA calculated an average dioxin distribution for each SIC code which had reported dioxin releases. For facilities that did not report a dioxin distribution, EPA used the average SIC code distribution to calculate the facility's dioxin TWPE. For the Pulp, Paper, and Paperboard Category, EPA calculated an average dioxin distribution for each regulatory phase, not the SIC code. EPA calculated the dioxin distribution based on phase instead of SIC code. EPA developed regulatory phases to prioritize mills that bleach. SIC codes are related to the predominant end product (pulp, paper, or paperboard). Because the congener distribution is more related to the process (bleaching), than the product, EPA calculated the average dioxin distribution using the regulatory phase, not the SIC code. For facilities that did not report a congener distribution and did not have any facilities within its SIC code that reported a congener distribution, EPA used a TWF equal to 10,595,840 (the median of the 17 dioxin congener TWFs).

Creosote

Creosote is a commonly used wood preservative, comprising many different chemicals. EPA did not develop a TWF for creosote using creosote toxicity data. Instead, EPA used the chemical composition of creosote, provided in IARC Monographs, Vol 35, "Coal Tar and Derived Products," [3] and the TWFs for these individual chemicals to calculate a TWF for creosote.

EPA made the following assumptions in developing the TWF for creosote:

1. Chemicals will be present in wastewater in the same proportion that they are present in the creosote.

2. If no data were available for a specific chemical, its concentration in creosote was assumed to be zero.

Using the data provided in IARC Monographs, Vol 35 [3], EPA calculated the average percentage that the chemical represents in creosote based on the high and low value. EPA calculated an adjusted TWF for each chemical by multiplying its chemical-specific TWF by its average percentage in creosote. EPA summed these values to calculate a new overall TWF for creosote discharges. Table 3-5 lists the chemical composition of creosote, along with the associated TWF of the various chemicals.

Table 3-5. Chemical Composition of Creosote and TWF

Pollutant	Chemical Percentage (%)	TWF	Adjusted TWF
Acenaphthene	11.85	0.032569744	0.00385951
Antracene	4.50	2.545594545	0.11455175
Benz(a)anthracene	0.21	36.26	0.076146
Benzo(a)pyrene	0.05	100.66	0.05033
Benzofluourenes	1.50	0.155555556	0.00233333
Biphenyl	1.20	0.036555826	0.00043867
Carbazole	1.60	0.709070997	0.01134514
Chrysene	2.80	31.01	0.86828
Dibenz(a,h)anthtracene	0.03	30.66	0.007665
Dibenzofuran	5.75	0.49215	0.02829863
Dimethylnaphthalenes	2.15		0
Fluoranthene	5.25	0.828982394	0.04352158
Fluorene	8.65	0.70105	0.06064083
Methylantracenes	3.95		0
Methylfluorenes	2.65	0.048695652	0.00129043
1-Methylnaphthalene	6.45	0.006222222	0.00040133
2-Methylnaphthalene*	6.60	0.193049257	0.01274125
Methylphenanthrenes	3.00	0.103703704	0.00311111
Naphthalene	9.65	0.015870135	0.00153147
Phenanthrene	18.50	0.294736842	0.05452632
Pyrene	4.75	0.093203279	0.00442716
Total			**1.3454395**

Creosote Releases from Wood Preserving Facilities

Information received from the Southern Pressure Treaters Association indicates that creosote discharges are estimated based on a surrogate analyte, such as oil and grease or total phenols. The Southern Pressure Treaters Association also indicated that TRI-reported PAC discharges are usually estimated based on the creosote estimates, but there is no standard approach for making these estimates. PACs and creosote contain many of the same chemicals (compare Table 3-5 and 3-6). Consequently, if EPA estimated the TWPE for both the PACs and the creosote in the same discharge, then the discharges of the toxic chemicals would be double counted. For this reason, if a wood preserving facility reports PACs and creosote in the same discharge (e.g., both are reported in direct discharges to surface water), EPA included the TWPE for the PAC discharges, but not the creosote discharges. If the wood preserving facility reports only creosote releases (and not PACs), EPA used the calculated creosote TWF of 1.345 to calculate the TWPE.

Polycyclic Aromatic Compounds (PACs)

PACs, sometimes known as polycyclic aromatic hydrocarbons (PAHs), are a class of organic compounds consisting of two or more fused aromatic rings. Table 3-6 lists the 21 individual compounds in the PAC category for TRI reporting, CAS number, and TWF, if available. EPA has TWFs for only 8 of the 21 PACs chemicals.

Table 3-6. Definition of Polycyclic Aromatic Compounds

PAC Compound	CAS Number	Toxic Weighting Factor
Benzo(a)anthracene	56-55-3	36.2600
Benzo(a)phenanthrene (chrysene)	218-01-9	31.0100
Benzo(a)pyrene	50-32-8	100.6600
Benzo(b)fluoranthene	205-99-2	30.6600
Benzo(j)fluoranthene	205-82-3	
Benzo(k)fluoranthene	207-08-9	30.6600
Benzo(j,k)fluorene (fluoranthene)	206-44-0	0.8290
Benzo(r,s,t)pentaphene	189-55-9	
Dibenz(a,h)acridine	226-36-8	
Dibenz(a,j)acridine	224-42-0	
Dibenzo(a,h)anthracene	53-70-3	30.6600
Dibenzo(a,e)fluoranthene	5385-75-1	
Dibenzo(a,e)pyrene	192-65-4	
Dibenzo(a,h)pyrene	189-64-0	
Dibenzo(a,l)pyrene	191-30-0	
7H-Dibenzo(e,g)carbazole	194-59-2	
7,12-Dimethylbenz(a)anthracene	57-97-6	

Table 3-6 (Continued)

PAC Compound	CAS Number	Toxic Weighting Factor
Indeno(1,2,3-cd)pyrene	193-39-5	30.6600
3-Methylcholanthrene	56-49-5	
5-Methylchrysene	3697-24-3	
1-Nitropyrene	5522-43-0	

PACs are classified as persistent, bioaccumulative and toxic (PBT) chemicals. They are likely present in petroleum products such as crude oil, fuel oil, diesel fuel, gasoline, and paving asphalt (bituminous concrete) and refining by-products such as heavy oils, crude tars, and other residues. PACs form as the result of incomplete combustion of organic compounds. PACs and closely related compounds are major constituents of creosote, a commonly used wood preservative.

For TRI, facilities that manufacture, process, or use more than 100 pounds of PACs per year must report the combined mass of PACs released; they do not report releases of individual compounds. In the development of *TRIReleases2002*, with the exception of releases reported by petroleum refineries, wood preservers, and pulp and paper mills, EPA assigned the TWF of benzo(a)pyrene to PACs. Because the TWF for benzo(a)pyrene (100.66) is higher than any other PAC, this represents a worst-case scenario. For PAC discharges that are not completely benzo(a)pyrene, this method overestimates the toxicity of the discharges.

Petroleum Refining PACs

EPA used a different approach to calculate TWPE for the Petroleum Refining Category. Facilities report to TRI the combined mass of PACs released, but for this industry EPA also has information on the distribution of PACs released from petroleum refineries. EPA assumed that the composition of PACs released by refineries is proportional to the composition of raw materials (crude oil) and products throughput at U.S. refineries. EPA developed this methodology for the study of the Petroleum Refining Industry supporting the 2004 ELG Program

Plan. After the methodology was developed , the calculated refinery PAC TWF changed due to the changes in TWFs for individual PAC chemicals.

PACs can occur in a number of petroleum products and crude oils; this information is available in literature (see Tables 3-7 and 3-8). In addition, the Energy Information Administration (EIA) publishes a yearly report of the amount of petroleum products produced in all U.S. petroleum refineries as well as the amount of crude oil consumed (see Table 3-9).

EPA made the following assumptions in developing the TWF for Petroleum Refining PACs:

1. PACs will be present in wastewater in the same proportion that they are present in the crude oil and products throughput at U.S. refineries. Table 3-9 presents these proportions.

2. If EPA did not have literature data available for a specific PAC compound, its concentration in the crude oil or product was assumed to be zero. If a PAC compound was reported as not detected, its concentration in the crude oil or product was assumed to be zero.

3. Where PAC composition is not available, it can be estimated using the composition from similar products. Table 3-10 lists the products for which PAC composition is not available and the similar product used to estimate the composition.

4. For crude oil, representative domestic and foreign oils can be used to calculate a weighted average PAC composition for crude oil. According to EIA[1], 39.1 percent (volumetric basis) of the total consumed crude oil in the United States in the year 2000 was domestic while 60.9 percent (volumetric basis) was imported. EPA selected South Louisiana Oil, for which PAC composition is available, as a representative domestic oil and Alberta Oil as a representative foreign oil. EPA assumed that a weighted average of the composition of these two crude oils is a reasonable representation of crude oil composition for the purpose of this study. EPA also used a specific weight of 0.92 for crude oil to convert PAC concentrations reported as mg/kg to mg/L.

[1]EIA: Petroleum Supply Annual 2000, Vol 1, Page 6 [4].

5. For refined products, EPA assumed a specific weight of 1.0 to simplify the calculation (i.e., no need to convert between mg/kg and mg/L).

Based on the above assumptions, EPA calculated the proportion of each of the 21 TRI PACs that would be present in refinery wastewater by multiplying each product percentage (shown in Table 3-9) by its chemical concentration (from Table 3-7 for products or Table 3-8 for crude oils). EPA then summed all the mass of each PAC, and calculated percentages for each chemical relative to the total mass of all 21 chemicals, presented in Table 3-11. For example, EPA estimated that 17.47 percent of the total PACs released in refinery wastewater is attributable to benzo(a)anthracene.

EPA calculated the overall TWF by multiplying the chemical proportions by their respective TWFs and summing all the values obtained from 21 PACs (see Table 3-11). This calculation resulted in a TWF value of 26.28. The toxic-pound equivalent of the combined mass of PACs reported to TRI by petroleum refineries can then be calculated by multiplying the reported PAC releases by 26.28.

Table 3-7. Portion of Petroleum Products Composed of PACs

PAC Chemical Name	Gasoline[1] mg/L	Kerosene[2] ppm (wt/vol)	No. 2 Diesel Fuels[3]	Bunker C No. 6 Oil[4]	Paving Asphalt[5]	Lube Oil[6] mg/kg
			mg/L or mg/kg			
Benzo(a)anthracene	4.30	0.75	0.80	90.00	90.00	0.68
Benzo(a)phenanthrene (chrysene)	2.00	2.00	3.40	196.00	80.00	3.20
Benzo(a)pyrene	1.80	0.50	nd	44.00	1.30	0.23
Benzo(b)fluoranthene		0.75				0.62[a]
Benzo(j)fluoranthene						
Benzo(k)fluoranthene		0.50			1.80	
Benzo(j,k)fluorene (fluoranthene)	6.50	4.00	2.80	240.00		2.00
Benzo(r,s,t)pentaphene						
Dibenz(a,h)acridine		0.20				
Dibenz(a,j)acridine						
Dibenzo(a,h)anthracene		0.75			4.60	
Dibenzo(a,e)fluoranthene						
Dibenzo(a,e)pyrene		0.45				
Dibenzo(a,h)pyrene		1.00				
Dibenzo(a,l)pyrene						
7H-Dibenzo(e,g)carbazole						
7,12-Dimethylbenz(a)anthracene						
Indeno(a,2,3-cd)pyrene		2.00				
3-Methylcholanthrene		0.10				
5-Methylchrysene			6.00			
1-Nitropyrene						

nd = Nondetect.
[a]Value for benzofluoranthenes.
Source: Data compiled in the American Petroleum Institute's (API's) *Transport and Fate of non-BTEX Petroleum Chemicals in Soil and Groundwater* (API Publication Number 4593, September 1994, Appendix A) [5].
[1]See Table A-8 (Guerine, 1977).
[2]See Table A-11 (Goodman and Haribons, 198?).
[3]See Table A-14 (Page et al., 1994).
[4]See Table A-15 (Pancirov and Brown, 1975).
[5]See Table A-15 (Malaiyandi et al., 1982).
[6]See Table A-16 (Eisenberg et al., 1988).

Table 3-8. Portion of Crude Oils Composed of PACs (mg/kg)

PAC Chemical Name	South Louisiana Crude Oil[1]	Alberta Crude Oil[2]	Weighted Average
Benzo(a)anthracene	1.7000		0.6645
Benzo(a)phenanthrene (chrysene)	17.5600	30.0000	25.1372
Benzo(a)pyrene	0.7500	nd	0.2932
Benzo(b)fluoranthene	0.5000	4.0000	2.6319
Benzo(j)fluoranthene	0.9000		0.3518
Benzo(k)fluoranthene	1.3000		0.5082
Benzo(j,k)fluorene (fluoranthene)	5.0000	6.0000	5.6091
Benzo(r,s,t)pentaphene			
Dibenz(a,h)acridine			
Dibenz(a,j)acridine			
Dibenzo(a,h)anthracene			
Dibenzo(a,e)fluoranthene			
Dibenzo(a,e)pyrene			
Dibenzo(a,h)pyrene			
Dibenzo(a,l)pyrene			
7H-Dibenzo(c,g)carbazole			
7,12-Dimethylbenz(a)anthracene			
Indeno(a,2,3-cd)pyrene			
3-Methylcholanthrene		3.0000	1.8273
5-Methylchrysene			
1-Nitropyrene			

nd = Nondetect.
Source: Data compiled in the American Petroleum Institute's (API's) *Transport and Fate of non-BTEX Petroleum Chemicals in Soil and Groundwater* (API Publication Number 4593, September 1994, Appendix A) [5].
[1]See Table A-3 (Pancirov and Brown, 1975).
[2]See Table A-4 (Benner et al. 1990).

Table 3-9. Supply and Disposition of Crude Oil and Petroleum Products

Finished Petroleum Products	1,000 bbl/year	% (Products Only)	Volume % (Total)
Finished Motor Gasoline	2,910,056	48.08	25.16
Reformulated	*939,493*		
Oxygenated	*42,221*		
Other	*1,928,342*		
Finished Aviation Gasoline	6,543	0.11	0.06
Jet Fuel	587,974	9.71	5.08
Naphtha-Type	*75*		
Kerosene-Type	*587,899*		
Kerosene	23,860	0.39	0.21
Distillate Fuel Oil	1,310,158	21.65	11.33
0.05% Sulfur and under	*905,064*		
Greater than 0.05% sulfur	*405,094*		
Residual Fuel Oil	254,843	4.21	2.20
Naphtha For Petroleum Feed Use	74,039	1.22	0.64
Other Oils For Petroleum Feed Use	71,762	1.19	0.62
Special Naphthas	21,868	0.36	0.19
Lubricants	65,687	1.09	0.57
Waxes	6,478	0.11	0.06
Petroleum Coke	266,107	4.40	2.30
Asphalt and Road Oil	192,223	3.18	1.66
Still Gas	241,365	3.99	2.09
Miscellaneous Products	19,957	0.33	0.17
Total Products	**6,052,920**	**100**	**52.33**
Crude Oil	**5,514,395**	**--**	**47.67**
TOTAL VOLUME OF PRODUCTS & CRUDE OIL	**11,567,315**	**--**	**100**

Source: EIA. Petroleum Supply Annual 2000, Vol. 1, Page 34 [4].

Table 3-10. Products for Which PAC Composition Is Not Available

Product	PAC Composition Taken from:
Finished Aviation Gasoline	Gasoline
Jet Fuel	Gasoline
Miscellaneous Products	Gasoline
Naphtha For Petroleum Feed Use	Gasoline
Other Oils For Petroleum Feed Use	Gasoline
Petroleum Coke	Paving Asphalt
Special Naphtha	Gasoline
Still Gas	Gasoline
Waxes	Lube Oil

Table 3-11. Calculation of Toxic Weighting Factor for Petroleum PACs

Pollutant	TWF	Chemical Percentage (%)	Adjusted TWF
Benzo(a)anthracene	36.26	17.47	6.33
Benzo(a)phenanthrene (Chrysene)	31.01	46.29	14.35
Benzo(a)pyrene	100.66	4.17	4.20
Benzo(b)fluoranthene	30.66	2.74	0.84
Benzo(j)fluoranthene		0.36	
Benzo(k)fluoranthene	30.66	0.70	0.21
Benzo(j,k)fluorene (Fluoranthene)	0.8290	24.32	0.20
Benzo(r,s,t)pentaphene			
Dibenz(a,h)acridine		0.00	
Dibenz(a,j)acridine			
Dibenzo(a,h)anthracene	30.66	0.43	0.13
Dibenzo(a,e)fluoranthene			
Dibenzo(a,e)pyrene		0.00	
Dibenzo(a,h)pyrene		0.00	
Dibenzo(a,l)pyrene			
7H-Dibenzo(c,g)carbazole			
7,12-Dimethylbenz(a)anthracene			
Indeno(1,2,3-cd)pyrene	30.66	0.01	0.00
3-Methylcholanthrene		0.00	
5-Methylchrysene		3.50	
1-Nitropyrene			
Total			**26.28**

Wood Preserving PACs

EPA used a different approach to calculate TWPE for discharges of PACs from wood preserving facilities (SIC 2491). Ten wood preserving facilities participated in a sampling program to determine the PACs released with their stormwater runoff. Over the period of a few months, the facilities collected grab samples of runoff during a rainfall event. The ten facilities collected a total of 74 samples. In 37 of these samples, at least one PAC was measured above the detection limit. EPA used the concentrations in these 37 samples to calculate a TWF for the PACs discharged from wood preserving facilities.

For all PAC concentrations reported as not detected, EPA assumed the concentration to be zero. Using the data provided, EPA calculated the average concentration of the six PAC compounds measured. EPA calculated the percentage of each compound relative to the total PACs. EPA calculated an adjusted TWF for each compound by multiplying its chemical-specific TWF by its percentage relative to the total PACs. EPA summed these values to calculate a new overall TWF value for PACs discharged in the wood preserving SIC code. Table 3-12 presents the TWFs for all PACs, the percentage of total PACs, and the adjusted TWF for each PAC.

Table 3-12. Calculation of Toxic Weighting Factor for Wood Preserving PACs

Chemical Name	Toxic Weighting Factor	Chemical Percentage (%)	Adjusted TWF
Benzo(a)anthracene	36.2600	6.73	2.44
Benzo(a)phenanthrene(chrysene)	31.0100	9.73	3.02
Benzo(a)pyrene	100.6600	0.49	0.49
Benzo(b)fluoranthene	30.6600	4.98	1.53
Benzo(j)fluoranthene	NA	0	
Benzo(k)fluoranthene	30.6600	0.78	0.24
Benzo(j,k)fluorene(fluoranthene)	0.8290	77.29	0.64
Benzo(r,s,t)pentaphene	NA	0	
Dibenz(a,h)acridine	NA	0	
Dibenz(a,j)acridine	NA	0	
Dibenzo(a,h)anthracene	30.6600	0	
Dibenzo(a,e)fluoranthene	NA	0	
Dibenzo(a,e)pyrene	NA	0	
Dibenzo(a,h)pyrene	NA	0	
Dibenzo(a,l)pyrene	NA	0	
7H-Dibenzo(e,g)carbazole	NA	0	
7,12-Dimethylbez(a)anthracene	NA	0	
Indeno(a,2,3-cd)pyrene	30.6600	0	
3-Methylcholanthrene	NA	0	
5-Methylchrysene	NA	0	
1-Nitropyrene	NA	0	
Total PACs TWF			**8.36**

NA - Not available.

Pulp, Paper, and Paperboard PACs

EPA used a different approach to calculate TWPE for discharges of PACs from the Pulp, Paper, and Paperboard Industry. The National Council of the Paper Industry for Air and Stream Improvement (NCASI), has provided guidance to the Pulp, Paper, and Paperboard Industry [6]. The NCASI guidance for PAC discharges includes a table listing the concentrations of PAC compounds found in wastewaters for several pulping types (kraft, bisulfite, CTMP, and TMP). EPA determined that in the United States, there are few bisulfite, CTMP, and TMP mills compared to the number of kraft mills. Therefore, EPA used the kraft mill concentrations to calculate the PAC TWF. Since the NCASI guidance does not distinguish between effluents from mills with or without bleaching, the calculated TWF was used for mills in all Pulp, Paper, and Paperboard Phases.

NCASI calculated the emission factors for the industry based on six PACs: benzo(a)anthracene, benzo(a)pyrene, benzo(b+k) fluoranthene, dibenzo(a,h)anthracene, fluoranthene, and Indeno(1,2,3-c,d)pyrene. For the kraft mills, only fluoranthene was detected above the method detection limit; however, four of the other five compounds were detected above the method detection limit for the other pulping types. Because the calculated TWF will be used for all Pulp, Paper, and Paperboard facilities, EPA used ½ the detection limit for compounds that were not detected in kraft mill wastewaters. NCASI also calculated the emission factor using ½ the detection limit for compounds that were not detected.

As shown in Table 3-13, EPA used the concentrations of six PACs to calculate a Pulp, Paper, and Paperboard PAC TWF. EPA summed the measured concentrations to calculate the total concentration of PACs in the effluent. EPA then calculated the percentage of each chemical relative to the total PACs in the effluent. EPA calculated an adjusted TWF for each compound by multiplying its chemical-specific TWF by its percentage relative to the total PACs. EPA summed these values to calculate a new overall TWF value for PACs discharged in the Pulp, Paper, and Paperboard Industry. Table 3-13 presents the TWFs for the six PACs, the percentage of total PACs, and the adjusted TWF for each PAC.

Table 3-13. Calculation of Toxic Weighting Factor for Pulp, Paper, and Paperboard PACs

Chemical Name	Toxic Weighting Factor	Chemical Percentage (%)	Adjusted TWF
Benzo(a)anthracene	36.2600	11.74	4.25
Benzo(a)pyrene	100.6600	11.74	11.81
Benzo(b+k)fluoranthene	30.6600	11.74	3.60
Benzo(j,k)fluorene(fluoranthene)	0.8290	17.84	0.15
Dibenzo(a,h)anthracene	30.6600	23.47	7.20
Indeno(1,2,3-cd)pyrene	30.6600	23.47	7.20
Total PACs TWF			**34.21**

3.4.4 Metal Compounds

For TRI reporting, facilities report metal compounds on a single reporting form and do not specify the individual compound(s) released. In addition, if the facility is required to report for a metal (e.g., zinc) and its compounds (e.g., zinc compounds), the facility may report both the metal and metal compound on a single form (reported as the metal compound). For metal compound reporting, the release quantities are based on the mass of the parent metal, only. To calculate TWPEs for metal compounds, EPA used the TWF for the parent metal. EPA then combined the TWPEs for the metal and metal compounds for ranking purposes (i.e., TWPE reported for "zinc and zinc compounds," rather than one TWPE for "zinc" and one TWPE for "zinc compounds"). This analysis does not double count metal discharges because all discharges are separated until the rankings are created. For example, if a facility reported 5 pounds of zinc and 10 pounds of zinc compounds, the discharges would be kept separate in the database. When the rankings are created however, the database would display that the facility has one entry of 15 pounds of "zinc and zinc compounds."

For more information about how the TWFs were developed and used, see Section 4.0 of this report.

3.4.5 Automated Stormwater Analysis

When reporting surface water discharges to TRI, facilities may specify the percentage of a chemical discharge that is attributed to stormwater (Section 5, Question 5.3, Column C of the Form R). EPA developed a table in *TRICalculations2002* that reports the percentage of surface water pollutant discharge attributed to stormwater for all facilities. Stormwater information is maintained in a separate table from the *TRI Master List* table (which calculates releases). EPA may use this table in future detailed reviews to analyze stormwater discharges from individual categories. The rankings created in *TRIReleases2002* include the TRI-reported stormwater releases in the calculation of TWPE.

3.4.6 Determination of "Basis of Estimate" of Reported TRI Releases

When reporting releases and transfers to TRI, facilities also indicate the basis for their estimate. There are four coded basis of estimates that facilities report to TRI: M (monitoring data or measurements), C (mass balance calculations), E (published emission factors), and O (other approaches such as engineering calculations or best engineering judgment). EPA developed a table in *TRICalculations2002* that contains the basis of estimate for direct discharges and indirect discharges (i.e., transfers to POTWs). This table is separate from the "TRI Master List" table. EPA used this table in *TRIReleases2002* to summarize how releases are reported for certain SIC codes and point source categories.

3.5 ***TRIReleases2002***

As the final step in developing *TRIReleases2002*, EPA grouped discharges from the *TRI Master List* table to create the point source category rankings and to perform other analyses. The remainder of this subsection describes the development of *TRIReleases2002* and discusses preliminary results in the following order:

- Section 3.5.1 discusses the SIC/Point Source Category Crosswalk;
- Section 3.5.2 describes the development of the 2002 TRI rankings;
- Section 3.5.2.1 analyzes the facilities with highest TWPE;
- Section 3.5.2.2 analyzes the pollutants with highest TWPE;
- Section 3.5.2.3 discusses category prioritization; and
- Section 3.5.3 explains how EPA considered reported discharges of pesticides and PCBs.

Table 3-14 lists the database tables that EPA created in *TRIReleases2002*.

Table 3-14. Tables Created in *TRIReleases2002*

Table Name	Description
Counts of Facilities by SIC	Includes counts of direct dischargers, indirect dischargers, facilities that discharge both directly and indirectly, total dischargers, and total facilities reporting to TRI by SIC code.
Counts of Facilities by Point Source Category	Similar to table *Counts of Facilities by SIC;* however, it reports the counts by Point Source Category.
Point Source Rankings	Presents rankings for all Point Source Categories based on calculated TWPEs. TWPEs were calculated using the total discharges to surface water by direct dischargers and indirect dischargers via POTWs. The indirect discharges take into account for pollutant removal occurring at the POTW.
SIC Code Rankings	Presents rankings for all SICs based on calculated TWPEs. TWPEs were calculated using the total discharges to surface water by direct dischargers and indirect dischargers via POTWs. The indirect discharges take into account for pollutant removal occurring at the POTW.

EPA also imported or linked two tables from *TRICalculations2002*:

- "TRI Master List"; and
- "TRI Master Facility List."

3.5.1 SIC/Point Source Category Crosswalk

EPA has developed ELGs for 56 specific categories of industrial dischargers. The categories, which may be divided into subcategories, are generally defined in terms of combinations of products made and the processes used to make these products. Facilities with data in TRI are identified by SIC code. Thus, to use TRI data to estimate the pollutants discharge by each point source category, EPA assigned each 4-digit SIC code to an appropriate point source category using the "SIC/Point Source Category Crosswalk" table. Section 5.0 of this report discusses the crosswalk in more detail.

3.5.2 Development of 2002 TRI Rankings

Figure 3-2 presents the *TRIReleases2002* database structure, including fields used from each data source. The SIC codes in the TRI Master List table are specific to each facility and each discharge. This allows EPA to make SIC adjustments to differentiate between various operations at one facility. The default SIC code is the primary facility SIC code reported in TRI. For the development of the rankings, EPA associated the SIC codes with the appropriate point source categories using the “SIC/Point Source Category Crosswalk” and the “Point Source Category Codes” tables. The TWPE for each discharge was calculated previously in *TRICalculations2002*.

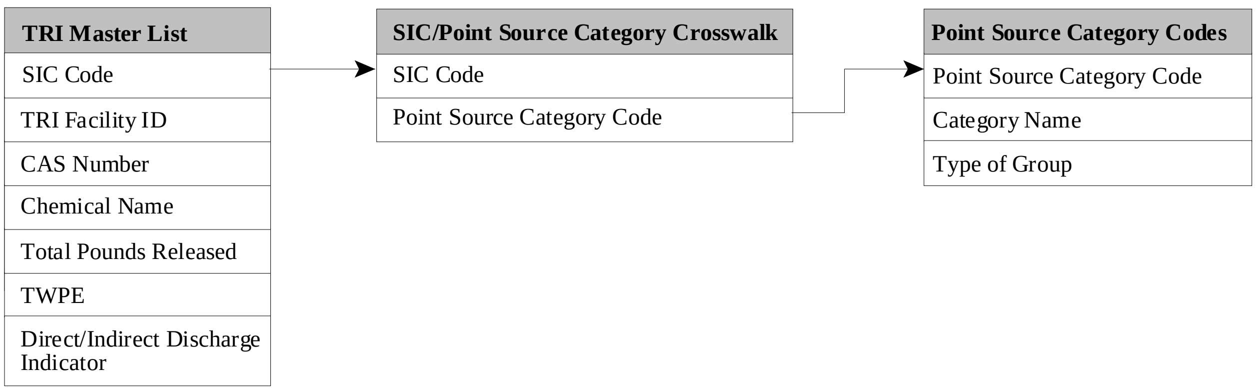

Figure 3-2. Basic Structure of the *TRIReleases2002* Database

TRIReleases2002 groups releases by chemical, facility, and point source category to allow EPA to perform the following analyses.

Top Facilities Analysis. EPA created a table that ranks facilities according to the TWPE discharged by the entire facility. This table also identifies the chemical that contributed the greatest amount of TWPE to the total facility TWPE. EPA used the table to identify facilities with unusually high reported discharges relative to other facilities in an industrial category. As discussed in the QA section, EPA contacted these facilities to learn more about their reported releases.

Top Pollutants Analysis. EPA created a table that ranks pollutants discharged according to the TWPE discharged by all facilities reporting in *TRIReleases2002*. The table also includes the number of facilities that report releasing the chemical. Using this analysis, EPA identified pollutants or pollutant categories for further analysis (e.g., pesticides and PCBs).

Category Prioritization. EPA uses Point Source Category rankings to identify categories that may warrant further review.

3.5.3 Pesticides and PCBs Analyses

For the 2005 screening-level analysis, EPA gave special consideration to reported discharges of pesticides (Section 3.5.3.1) and PCBs (Section 3.5.3.2). Pesticide and PCB releases may be associated with current operations in the category, or may have resulted from cleanup actions for past practices. If releases are not related to current operations, they are not useful in characterizing the category's potential impacts on human health and the environment.

3.5.3.1 Pesticides

A pesticide is any substance or mixture of substances intended to prevent, destroy, repel, or mitigate any pest. Pesticides also refers to herbicides, fungicides, and various other substances used to control pests.

Table 3-15 presents the top 10 pesticides ranked by TWPE, including the number of facilities reporting discharges and the pounds discharged. In 2002, 132 facilities reported discharging 68 pesticides. The total pesticide discharges after accounting for POTW removals, as appropriate, was 630,000 TWPE, which represented 3.34 percent of total nationwide TRI TWPE. Picloram discharges were the largest pesticide discharges (measured as TWPE) and account for 79 percent of the total pesticide TWPE. Dichlorvos, chlordane, and toxaphene were also significant contributors, with discharges of each accounting for approximately five percent of total pesticide TWPE.

Table 3-15. Pesticides Discharged by TWPE

Chemical Name	Number of Facilities	Lbs/Year	TWPE after POTW Removals (lb-eq/yr)	TWPE percent of Nationwide TWPE	TWPE Percent of Total Pesticides TWPE
Picloram	2	240,111	498,021	2.64	79.04
Dichlorvos	1	6.24	34,935	0.19	5.54
Chlordane	4	13.99	27,876	0.15	4.42
Toxaphene	3	0.86	25,758	0.14	4.09
Potassium Dimethyldithiocarbamate	2	12,360	11,536	0.06	1.83
Heptachlor	3	1.01	8,615	0.05	1.37
Diazinon	3	12.35	7,685	0.04	1.22
Cyfluthrin	1	26.00	5,463	0.03	0.87
Atrazine	6	794	1,834	0.010	0.29
Merphos	1	23.00	1,549	0.008	0.25

Source: *TRIReleases2002_v02* Database [7].

Table 3-16 lists the facilities reporting discharges of the pesticides with the highest reported TWPE discharges (picloram, dichlorvos, chlordane, toxaphene, potassium dimethyldithiocarbamate, and heptachlor).

Table 3-16. Facilities Reporting Discharges of the Pesticides with the Highest TWPE

Chemical	Facility	Point Source Category	CFR Citation	Total TWPE after POTW Removals (lb-eq/yr)
Picloram	Dow Chemical Co., Freeport, TX	Pesticide Chemicals	40 CFR Part 455	497,772
	Dow Chemical Co., Midland, MI	Pesticide Chemicals	40 CFR Part 455	249
Dichlorvos	Boehringer Ingelheim Vetmedica Inc., Elwood, KS	Pesticide Chemicals	40 CFR Part 455	34,935
Chlordane (no longer manufactured)	DuPont Chambers Works, Deepwater, NJ	Pesticide Chemicals and Centralized Waste Treatment	40 CFR Part 455 and 40 CFR Part 437	27,506
	Clean Harbors Deer Park L.P., Deer Park, TX	Landfills and Waste Combustors	40 CFR Part 445 and 40 CFR Part 444	359
	Wayne Disposal Inc., Belleville, MI	Landfills and Waste Combustors	40 CFR Part 445 and 40 CFR Part 444	10.46

Table 3-16 (Continued)

Chemical	Facility	Point Source Category	CFR Citation	Total TWPE after POTW Removals (lb-eq/yr)
Toxaphene (no longer manufactured)	Clean Harbors Deer Park L.P., Deer Park, TX	Landfills and Waste Combustors	40 CFR Part 445 and 40 CFR Part 444	25,515
	Wayne Disposal Inc., Belleville, MI	Landfills and Waste Combustors	40 CFR Part 445 and 40 CFR Part 444	244
Potassium Dimethyldithi ocarbamate	Graphic Packaging Corp., Kalamazoo, MI	Pulp, Paper and Paperboard	40 CFR Part 430	11,518
	GM NAO Wilmington Assembly Plant, Wilmington, DE	Metal Finishing	40 CFR Part 433	17.68
Heptachlor (no longer manufactured)	DuPont Chambers Works, Deepwater, NJ	Pesticide Chemicals and Centralized Waste Treatment	40 CFR Part 455 and 40 CFR Part 437	8,530
	Clean Harbors Deer Park L.P., Deer Park, TX	Landfills and Waste Combustors	40 CFR Part 445 and 40 CFR Part 444	85.30

Source: *TRIReleases2002*_v02 Database [7].

Picloram is a systemic herbicide used to control deeply rooted herbaceous weeds and woody plants in rights-of-way, forestry, rangelands, pastures, and small grain crops. It is applied in the largest amounts to pasture and rangeland, followed by forestry. Picloram products have no household or residential uses. All picloram products are classified as “restricted use” pesticides, and may be applied only by or under the direct supervision of certified applicators.

Dichlorvos is used for insect control in food storage areas, green houses, and barns, and control of insects on livestock. Veterinarians also use it to control parasites on pets. Dichlorvos TWPE discharges contributed 5.5 percent to the total pesticide TWPE. Note that only one facility, Boehringer Ingelheim Vetmedica Inc., reported discharges of dichlorvos.

Chlordane, toxaphene, and heptachlor are no longer manufactured in the United States. These three pesticides together account for 9.9 percent of the total pesticide TWPE. Toxaphene was first commercialized in 1948, and was used on a variety of crops as well as on livestock and poultry. All domestic uses of toxaphene were banned in 1990, but it is still used as an insecticide on bananas and pineapples in Puerto Rico and the Virgin Islands. Chlordane is a broad-spectrum insecticide that was used on agricultural crops, in homes and gardens, and for termite and ant control. Chlordane has been banned from domestic use since 1988, but was manufactured for export up until 1997 by one corporation. Heptachlor was first registered in the United States in 1952 for use as a broad-spectrum insecticide. It is presently used in the United States only to control fire ants in buried transformer and telephone/cable boxes. The production of heptachlor in the United States ceased in 1997 [8]. Discharges of chlordane, toxaphene, and heptachlor were reported by a commercial and industrial wastewater treatment facility and by commercial incinerators combusting hazardous waste.

Reported discharges of potassium dimethyldithiocarbamate accounted for 1.83 percent of total pesticide TWPE. Potassium dimethyldithiocarbamate is used as a fungicide on fruit, vegetables, and tobacco, and it is also used in metal finishing wastewater treatment. If used in large amounts, the chemical can cause process upsets in the biological treatment systems used at POTWs, fish kills if discharged to surface water, and severe damage to surface water ecosystems. Graphic Packaging Corp, which reported the largest discharges of potassium dimethyldithiocarbamate (99.8 percent of total potassium dimethyldithiocarbamate reported discharges) belongs to the Pulp, Paper, and Paperboard Point Source Category. GM NAO Wilmington Assembly Plant, which also reported discharges of potassium dimethyldithiocarbamate, is in the Metal Finishing Point Source Category.

Table 3-17 shows the top five pesticide-discharging facilities and their TWPEs. Discharges from these top five facilities account for 96.8 percent of the total pesticide TWPE reported.

Table 3-17. Pesticide-Discharging Facilities

Facility Name	Point Source Category	TWPE After POTW Removals (lb-eq/yr)	Percent of Total Pesticide TWPE	Pesticides Reported Discharged
Dow Chemical Co., Freeport, TX	Pesticide Chemicals	497,801	79.00	Picloram, 1,3-Dichloropropylene
Boehringer Ingelheim Vetmedica Inc., Elwood, KS	Pesticide Chemicals	38,265	6.07	Dichlorvos, diazinon, tetrachlorvinphos
Du Pont Chambers Works, Deepwater, NJ	OCPSF and Centralized Waste Treatment	36,143	5.74	Heptachlor, chlordane, pendimethalin
Clean Harbors Deer Park L.P., Deer Park, TX	Landfills and Waste Combustors	25,972	4.12	Toxaphene, chlordane, heptachlor, malathion
Graphic Packaging Corp., Kalamazoo, MI	Pulp, Paper and Paperboard	11,518	1.83	Potassium dimethyldithiocarbamate

Source: *TRIReleases2002_v02* Database [7].

Dow Chemical Freeport Facility, reporting under SIC 28-Chemicals and Allied Products, manufactures various types of chemicals including picloram. The facility reported discharges of only two pesticides: picloram and 1,3-dichloropropylene. Picloram discharges from Dow Chemical Freeport Facility accounted for 79 percent of the total pesticide TWPE, while 1,3-dichloropropylene discharges accounted for less than 0.1 percent of the total pesticide TWPE.

Boehringer Ingelheim Vetmedica Inc. reported pesticide discharges accounting for 6.1 percent of total pesticide TWPE. The facility reported discharging dichlorvos, diazinon, and tetrachlorvinphos. Boehringer Ingelheim Vetmedica Inc. manufactures animal health products including insecticides. Its SIC code is 2834, Pharmaceutical Preparations, which includes veterinary pharmaceuticals. Because Beohringer Ingelheim Vetmedica Inc. reported discharges of only pesticide chemicals, EPA categorized their pesticide discharges under Pesticide Chemicals rather than Pharmaceutical Manufacturing.

DuPont Chambers Works reported pesticide discharges accounting for 5.7 percent of total pesticide TWPE. The facility reported discharges of primarily chlordane and heptachlor. Based on its SIC codes, DuPont Chambers Works' primary operations are the manufacture of industrial organic chemicals. Its other operations include manufacturing additional materials such as plastics, synthetic resins and rubber, and dyes and pigments, and performing commercial, physical and biological research. The facility also operates a centralized wastewater treatment plant. DuPont Chambers Works falls under the OCPSF Point Source Category. However, the TRI discharges reported for heptachlor, chlordane, and pendimethalin could not have come from the organic chemical manufacturing process at DuPont Chambers Works because the manufacture of heptachlor and chlordane is banned in the United States, and pendimethalin is manufactured by BASF. EPA confirmed with DuPont that the pesticide discharges were released as a result of the centralized waste treatment operations from off-site wastewater [9]. Therefore, EPA included the pesticide discharges from DuPont Chambers Works under the Centralized Waste Treatment (CWT) Point Source Category.

Clean Harbors provides environmental services including hazardous and nonhazardous waste transportation and disposal, laboratory chemical packing, emergency response, field services, and industrial maintenance. The Deer Park facility operates an incinerator for the destruction of hazardous and industrial waste. Clean Harbors reported discharges of mainly toxaphene, chlordane, and heptachlor. The total pesticide discharges reported by the facility accounted for 4.1 percent of total pesticide TWPE. EPA contacted Clean Harbors and learned that, when the scrubber is cleaned after the incineration process, toxaphene, chlordane, and heptachlor residues are collected in the cleaning water and discharged from the facility. Furthermore, the facility contact indicated that these chemicals are monitored once a month and that each chemical was detected every month. Clean Harbor discharges to wastewater treatment are determined by multiplying the concentration of the pesticide by the final monthly effluent water rate. The totals for each month are added together to arrive at an annual discharge value [10].

Graphic Packaging Corporation manufactures and distributes paperboard and paperboard packaging products. The facility reported discharges of only one pesticide, potassium dimethyldithiocarbamate, which accounted for 1.8 percent of the total pesticide TWPE.

Table 3-18 lists, by TWPE, the categories of facilities that reported pesticides discharges. The Pesticide Chemicals Point Source Category, had the greatest pesticide discharges, contributing a total of 88 percent of the total pesticide TWPE. The waste management point source categories[1], which include Landfills, Commercial Hazardous Waste Combustors and Centralized Waste Treatment, reported TWPE discharges accounting for 10 percent of the total pesticide TWPE.

Table 3-18. Pesticide-Discharging Point Source Categories

Point Source Category	TWPE after POTW Removals (lb-eq/yr)	Percent of Total Pesticide TWPE
Pesticide chemicals manufacturing	552,226	87.63
Landfills and Waste Combustors (commercial incinerators combusting hazardous waste) and Centralized Waste Treatment	62,978	10.00
Pulp, paper and paperboard	11,888	1.89
Inorganic chemicals	785	0.12
Metal Finishing	648	0.10
Timber products processing	554	0.09
Fertilizer manufacturing	430	0.07
Rubber Manufacturing	228	0.04
Paint formulating	214	0.03
Electroplating	166	0.03
Pharmaceutical manufacturing	61.32	0.01
Dairy products processing	3.02	0.0005
Miscellaneous Foods and Beverages	1.53	0.0002
Organic chemicals, plastics and synthetic fibers	1.24	0.0002
Soaps and detergents manufacturing	0.98	0.0002
Petroleum refining	0.03	0.00
Plastic molding and forming	0.00	0.00
SUM	630,185	

Source: *TRIReleases2002_v02* Database [7].

[1] Landfills, Commercial Hazardous Waste Combustors and Centralized Waste Treaters all fall under the same SIC Code (4953). Since the discharges from SIC Code 4953 can be attributed to one or more of these categories with no way of differentiating between them, for purposes of this review EPA combined them together.

Conclusions

- Pesticides discharges should be included in the appropriate point source categories because the major reported discharges came from current facility practices as opposed to site remediation activities.

- A total of 132 facilities reported discharging 284,000 pounds and 630,000 TWPE of pesticides, accounting for 3.34 percent of total nationwide TWPE.

- Chlordane, toxaphene and heptachlor, which account for 9.9 percent of total pesticides TWPE, are no longer manufactured in the United States. Toxaphene and chlordane use is banned, while the use of heptachlor is severely restricted. Discharges of these three pesticides came from commercial wastewater treatment, commercial incineration, and hazardous waste landfills.

3.5.3.2 PCBs

PCBs are mixtures of over 200 individual synthetic halogenated aromatic hydrocarbons known as congeners. They are no longer manufactured in the United States, but are currently used as dielectric agents, heat transfer agents, lubricants, flame retardants, plasticizers, and waterproofing materials [8]. In addition, the same chemical processes that produce dioxins and furans have the potential to unintentionally form trace amounts of PCBs because the combustion chemistry that forms dioxins may also form PCBs. The major source of PCB contamination is the reintroduction of PCBs into the environment from environmental sinks (e.g., the plume downwind of Chicago, which is a major source of PCB contamination in Lake Michigan) [11]. PCB discharges can also come from urban runoff from areas with contaminated soil and leakage from transformers [11].

As shown in Table 3-19, 10 facilities reported PCB discharges to TRI in 2002. The total TWPE discharge after accounting for POTW removals, as appropriate, was 1 million TWPE, which accounted for 4.81 percent of total nationwide TRI TWPE.

Table 3-19. PCB Summary Data

Number of Facilities			TWPE after POTW Removals (lb-eq/yr)			TWPE as % of National TWPE		
Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
6	4	10	1,049,016	2,418	1,051,434	4.8	0.01	4.81

Source: *TRIReleases2002_v02* Database [7].

Table 3-20 lists all the facilities that reported PCB discharges to TRI in 2002, ranked in decreasing order by TWPE. The three facilities with the highest TWPE discharges accounted for 99.7 percent of the total PCB TWPE reported.

Table 3-20. PCB-Discharging Facilities

Facility Name	Point Source Category	City	State	Total Pounds after POTW Removals	Total TWPE after POTW Removals (lb-eq/yr)	% of Total PCB TWPE
Kaiser Aluminum & Chemical Corp. Trentwood Works	Aluminum Forming	Spokane	WA	27.5	935,924	89.01
Oxy Vinyls L.P. La Porte VCM Plant	Vinyl Chloride and Chlor-Alkali (VCCA)	La Porte	TX	3	102,101	9.71
DuPont Edge Moor	Inorganic Chemicals	Edgemoor	DE	0.30	10,210	0.97
EQ Resource Recovery Inc.	Landfills and Waste Combustors	Romulus	MI	0.05	1,821	0.17
Wabash Aluminum Alloys L.L.C. Syracuse Plant	Non-Ferrous Metals Manufacturing	East Syracuse	NY	0.02	681	0.06
Sun Chemical Corp.	Organic Chemicals, Plastics and Synthetic Fibers	Cincinnati	OH	0.01	364	0.03
Marcal Paper Mills Inc.	Paper and Allied Products	Elmwood Park	NJ	0.005	182	0.02
GB Biosciences Corp.	Inorganic Chemicals	Houston	TX	0.002	59.22	0.01
Waldorf Corp. (Dba Rock Tenn Co.)	Paper and Allied Products	Saint Paul	MN	0.001	50.98	0.00
Stockton Cogen Co.	Steam Electric Power Generation	Stockton	CA	0.001	40.84	0.00
Total				**30.89**	**1,051,434**	

Source: *TRIReleases2002_v02* Database [7].

Kaiser Aluminum Trentwood Works reported the largest PCB discharges, contributing 89 percent of the total PCB TWPE reported to TRI. Kaiser Aluminum Trentwood Works produces fabricated aluminum products for aerospace, ground transportation, and general engineering applications. In November 2004, the Washington State Department of Ecology reported that they had fined Kaiser Aluminum Trentwood Works $40,000 for discharging large amounts of PCBs into the Spokane River in Washington. The amount discharged on the four days monitored was greater than 1,000 times the amount of PCBs normally expected from the facility and greatly exceeded water-quality limits set to protect human health. The Washington State Department of Ecology issued an order requiring the company to determine the source of the PCBs, stop the discharge, improve its system for reporting monitoring results, and increase monitoring if PCB levels increase again [12]. EPA contacted Kaiser Aluminum Trentwood Works and learned that the facility measures its PCB discharges by taking grab samples of their effluent wastewater and performing a profile analysis. The facility contact confirmed that high levels of PCBs were detected a few times. He also indicated that not all of the PCB discharges come from process wastewater flows, and, therefore, estimated that 50 percent of the PCB discharges came from stormwater. The PCBs that came from the facility's current activities were discharged from a nonflammable fluid used in the aluminum manufacturing process. Kaiser Aluminum Trentwood Works has since added control technologies to their manufacturing process that have reduced their PCB discharges to levels far below what they were in 2002 [13].

Oxy Vinyls' reported PCB discharges accounted for 9.7 percent of total PCB TWPE reported to TRI. Oxy Vinyls operations include the manufacture of PVC resin, vinyl chloride monomer, and chlor-alkali (sodium hydroxide, chlorine, and hydrogen) and the cogeneration of electricity. The LaPorte Plant manufactures vinyl chloride monomer as its principal product. EPA contacted Oxy Vinyls and learned that the facility measures its PCB discharges from samples of their process wastewater. PCBs at Oxy Vinyls are formed as an unintentional by-product of ethylene dichloride production [14].

DuPont Edgemoor reported PCB discharges accounting for only 0.97 percent of total PCB TWPE reported to TRI. The DuPont Edgemoor facility produces titanium-based white pigments for paper, coatings, plastics, and specialty applications. EPA contacted DuPont Edgemoor and learned that their PCB discharges originate from treated process water and stormwater outfalls. The facility monitored its process wastewater for PCBs seven times in 2002 and its stormwater three times in 2001. Each time the facility monitored its process wastewater, PCBs were detected. The PCBs are formed as unintentional trace reaction by-products in the titanium dioxide manufacturing process [15].

Table 3-21 lists the point source categories discharging PCBs, the number of facilities in each category that reported PCB discharges, and the total TWPE discharged. The Aluminum Forming Point Source Category had the greatest reported PCB discharges, contributing 89 percent of total PCB TWPE. EPA noted, however, that only one facility belonging to the Aluminum Forming Point Source Category, Kaiser Aluminum and Chemical Corporation Trentwood Works, reported PCB discharges. The second largest "category,"[1] which accounts for 10 percent of the total PCP TWPE, is the VCCA category. Again, only one facility reported discharging PCBs in this category. Together, these two point source categories account for 99 percent of the total PCB TWPE and 4.7 percent of the total nationwide TWPE. The other point source categories are not significant PCB dischargers, with discharges ranging from 0.98 to 0.004 percent of total PCB TWPE.

Table 3-21. Point Source Categories by TWPE

Point Source Category	Number of Reporting Facilities	TWPE after POTW Removals (lb-eq/yr)	Percent of Total PCB TWPE
Aluminum Forming	1	935,924	89.01
Vinyl Chloride and Chlor-Alkali	1	102,101	9.71
Inorganic Chemicals	2	10,269	0.98
Waste Combustors (commercial incinerators combusting hazardous waste)	1	1,821	0.17
Nonferrous Metals Manufacturing	1	681	0.06
OCPSF	1	364	0.03
Paper & Allied Products	2	233	0.02
Steam Electric Power Generation	1	40.84	0.004
Total	**10**	**1,051,434**	

Source: *TRIReleases2002_v02* Database [7].

[1]Vinyl chloride discharges are categorized under the OCPSF Point Source Category and chlor-alkali discharges are categorized under the Inorganic Chemicals Point Source Category. EPA is currently reviewing these effluent guidelines concurrently for possible revision. For this review, EPA is combining them together as a single category.

Conclusions

- PCB discharges should be included in the appropriate point source categories. PCB discharges reported to TRI in 2002 by the three facilities discharging the largest PCB TWPE (99.7 percent of total PCB TWPE) originated from unintentional by-product formation from the manufacture of ethylene dichloride and titanium dioxide and from PCB-containing fluids used to manufacture aluminum products.

- In 2002, 10 facilities reported discharging 31 pounds and 1 million TWPE of PCBs.

- The Aluminum Forming Point Source Category had the highest PCB-reported discharges in 2002, accounting for 89 percent of total PCB TWPE. Only one facility from this point source category, however, reported discharging PCBs.

3.5.4 Visual Basic Version of Databases

One of EPA's goals in creating the *TRIReleases2002* database was to automate database development and improve documentation. In case of any data changes, the user should be able to update the *TRICalculations2002* and *TRIReleases2002* databases by following a step-by-step procedure. Therefore, EPA developed versions of *TRICalculations2002* and *TRIReleases2002* using Visual Basic code. The Visual Basic version of the *TRICalculations2002* database allows users to update necessary tables and recreate the entire database with a click of the mouse. By recreating the entire database, the user is assured that all necessary updates are performed. The Visual Basic version of *TRIReleases2002* allows users to view and update various analyses shown in Figure 3-3.

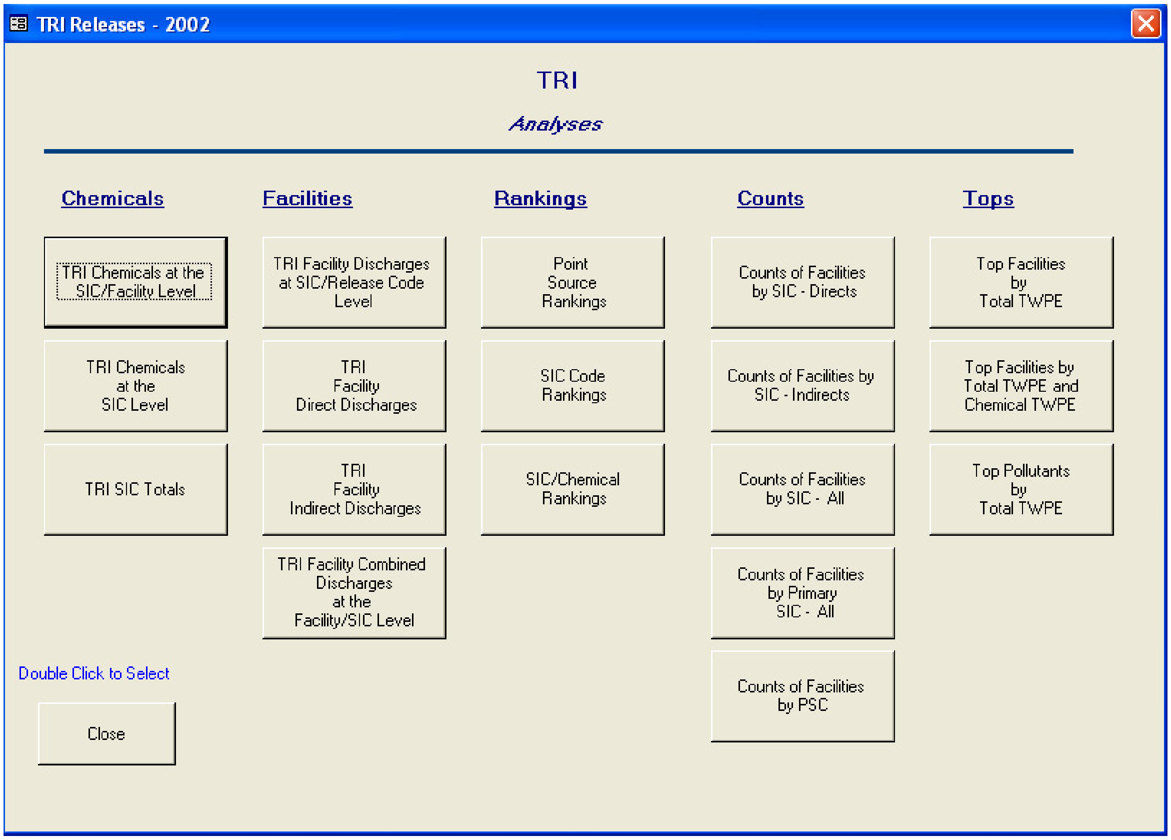

Figure 3-3. The Various Analyses That Can Be Performed in the Visual Basic Version of *TRIReleases2002*

To ensure the quality of the Visual Basic version of *TRICalculations2002* and *TRIReleases2002*, EPA verified that the output tables from the two versions of the databases matched. From *TRICalculations2002*, EPA compared the "TRI Master List" Table and the "TRI Master Facility List" Table. From *TRIReleases2002*, EPA compared the "Point Source Rankings" Table, the "Counts of Facilities by SIC" Table, and the "Top Pollutants by Total TWPE" Query.

3.6 Results of the Preliminary Analysis of the *TRIReleases2002* Database

This section presents the results of the analysis of *TRIReleases2002* database. Table 3-22 presents the Point Source Category rankings by TWPE. Attachment 1-C presents the four-digit SIC code rankings by TWPE. Attachment 1-D presents the total TWPE for chemicals in TRI.

Table 3-22. Point Source Category Rankings

40 CFR Part	Point Source Category	Number of Direct Dischargers	Number of Indirect Dischargers	Number of Facilities that Discharge Both Direct and Indirect	Number of Facilities Reporting Releases to Any Medium	TWPE (lb-eq/yr)
414.1	Vinyl Chloride and Chlor-Alkali	31	6	2	54	9,170,594
430	Pulp, Paper and Paperboard	199	85	11	509	3,128,678
433	Metal Finishing	296	1,802	321	7,451	972,115
467	Aluminum Forming	50	102	49	448	941,176
420	Iron and Steel Manufacturing	116	69	52	375	833,620
423	Steam Electric Power Generation	340	15	21	693	804,635
414	Organic Chemicals, Plastics and Synthetic Fibers	239	491	65	2,192	627,857
455	Pesticide Chemicals Manufacturing	30	28	7	123	554,485
419	Petroleum Refining	250	66	36	928	503,802
415	Inorganic Chemicals	71	89	38	487	280,977
444	Waste Combustors (Commercial Incinerators Combusting Hazardous Waste)	13	26	8	113	220,577
445	Landfills	13	26	8	113	220,577
428	Rubber Manufacturing	34	126	60	527	173,304
463	Plastic Molding and Forming	25	104	22	1,458	97,297
466	Porcelain Enameling	48	127	9	556	88,749
429	Timber Products Processing	80	41	25	1,012	71,785
471	Nonferrous Metals Forming and Metal Powders	58	107	59	524	71,384
440	Ore Mining and Dressing	30	4	-	80	66,544
421	Nonferrous Metals Manufacturing	66	30	19	242	63,694
464	Metal Molding and Casting (Foundries)	96	83	36	629	47,630
437	Centralized Waste Treaters	2	-	-	1	38,055
413	Electroplating	21	414	35	643	34,851
410	Textile Mills	16	68	8	300	32,765
432	Meat and Poultry Products	87	72	16	307	21,983
454	Gum and Wood Chemicals	8	4	1	27	15,611
439	Pharmaceutical Manufacturing	14	109	10	230	9,685
418	Fertilizer Manufacturing	41	4	3	120	6,403
468	Copper Forming	38	59	50	265	5,845
407	Fruits and Vegetable Processing	9	17	2	104	4,042
406	Grain Mills Manufacturing	6	12	6	123	3,882
469	Electrical and Electronic Components	5	91	10	188	3,681
424	Ferroalloy Manufacturing	5	2	1	15	3,541
425	Leather Tanning and Finishing	1	22	4	36	3,399
461	Battery Manufacturing	4	31	32	83	3,063
426	Glass Manufacturing	18	47	15	260	2,456
434	Coal Mining	27	-	-	82	2,354
411	Cement Manufacturing	25	4	1	339	2,025
417	Soaps and Detergents Manufacturing	3	83	5	209	1,983
436	Mineral Mining and Processing	42	42	9	463	1,422
405	Dairy Products Processing	31	213	3	368	633
435	Oil & Gas Extraction	-	-	1	1	553
446	Paint Formulating	10	57	7	499	529
458	Carbon Black Manufacturing	8	-	-	20	514

Table 3-22 (Continued)

40 CFR Part	Point Source Category	Number of Direct Dischargers	Number of Indirect Dischargers	Number of Facilities that Discharge Both Direct and Indirect	Number of Facilities Reporting Releases to Any Medium	TWPE (lb-eq/yr)
460	Hospital	1	-	-	3	382
422	Phosphate Manufacturing	15	1	-	33	377
457	Explosives	10	2	2	40	249
438	Metal Products and Machinery	37	-	-	-	213
409	Sugar Processing	17	1	-	33	112
443	Paving and Roofing Materials (Tars and Asphalt)	3	8	1	256	104
447	Ink Formulating	1	9	-	89	92
408	Canned and Preserved Seafood	6	-	-	18	35
465	Coil Coating	1	51	-	129	12
427	Asbestos Manufacturing	-	-	1	1	6

3.7 References

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15. Reich, Robert and Ken Wood. 2005. DuPont Edgemoor. Personal Communication. *DuPont's EdgeMoor, DE and New Johnsonville, TN Releases in TRI 2002* . February 28. Docket OW-2004-0032. DCN 01550.

4.0 TOXIC WEIGHTING FACTORS (TWF)

PCS and TRI provide chemical discharge information in the form of mass loads. In order to estimate potential impacts of these loads on human health and the environment, EPA estimates toxic-equivalent mass discharges using toxic weighting factors (TWFs). EPA's Engineering and Analysis Division (EAD) developed TWFs for use in its effluent limitations guidelines (ELG) development program to allow relative comparison of pollutants. The toxic weighted pound equivalent (TWPE) is the mass of a pollutant or chemical discharged that accounts for its toxicity. EPA calculates TWPE by multiplying the estimated mass (in pounds) of the chemical discharged by its TWF. The remainder of this section is divided into the following subsections:

- Section 4.1 - TWF background and development;
- Section 4.2 - Description of TWFs used for the 2005 Annual Review and comparison to TWFs used for the 2004 Annual Review; and
- Section 4.3 - Chemicals for which EPA has not developed TWFs.

4.1 <u>TWF Background and Development</u>

In the 30 years since Congress passed the 1972 Clean Water Act (CWA), EPA has promulgated effluent guidelines that address 56 categories, and in the process has developed a variety of tools and methodologies to evaluate effluent discharges. EAD maintains a Toxics Data Base containing aquatic life and human health toxicity data, as well as physical/chemical property data, for more than 1,900 pollutants compiled from over 100 references. The pollutants in this database are identified by a unique Chemical Abstract Service (CAS) number. TWFs calculated from these data account for differences in toxicity among the pollutants of concern and provide the means to compare mass loadings of different pollutants on the basis of their toxic potential. For example, a mass loading of a pollutant in pounds per year (lb/yr) may be multiplied by a pollutant-specific weighting factor to derive a "toxic-equivalent" loading (lb-equivalent/yr). Throughout this document, the toxic-equivalent is also referred to as Toxic-Weighted Pound Equivalents, or TWPE.

TWFs are derived from chronic aquatic life criteria or toxic effect levels and human health criteria or toxic effect levels established for the consumption of fish. For carcinogenic substances, EPA sets the human health risk level at 10^{-5} (i.e., protective to a level allowing 1 in 100,000 excess lifetime cancer cases over background). In the TWF method for assessing water-based effects, these toxicity levels of pollutants of concern are compared to a benchmark value that represents the toxicity level of a specified pollutant. EPA selected copper, a metal commonly detected and removed from industrial effluent, as the benchmark pollutant. EPA has used copper in previous TWF calculations for the cost-effectiveness analysis of effluent guidelines. Although EPA revised the water quality criterion for copper in 1998 (to 9.0 micrograms per liter [ug/L]), the TWF method uses the former criterion (5.6 ug/L) to facilitate comparisons with cost-effectiveness values calculated for other regulations. The former criterion for copper (5.6 ug/L) was reported in the 1980 Ambient Water Quality Criteria for Copper document [1].

To calculate TWF values, EPA adds an aquatic life effects and human health effects for each pollutant. EPA uses chronic effects on aquatic life and human health effects from ingesting contaminated organisms (HHOO) as the basis for TWFs. The TWF is calculated by dividing aquatic life and human health criteria (or toxic effect levels) for each pollutant, expressed as a concentration in micrograms per liter (mg/L), into the former copper criterion of 5.6 mg/L;

$$\text{TWF} = \frac{5.6}{\text{AQ}} + \frac{5.6}{\text{HHOO}}$$

where:

TWF	=	toxic weighting factor
AQ	=	chronic aquatic life value (μg/L)
HHOO	=	human health (ingesting contaminated organisms only) value (μg/L).

For more details on how EAD determines TWFs, see Revisions to EAD's Toxic Weighting Factor Methodology Parameters [2].

4.2 TWFs Used for the 2005 Annual Review

In preparation for the 2005 Annual Review, EPA reviewed and updated its TWF model. EPA summarized its development and application in the record supporting the 2006 Plan [3].

During the development of the TWFs used for the 2005 Annual Review, EPA included Relative Source Contribution (RSC) in its TWF calculations, and made several updates to the TWFs used in the 2004 review. The following subsections discuss the impact of RSC on the screening-level analysis and compare the TWFs used for the 2005 review to the 2004 TWFs. Attachment 4 presents the TWFs used for the 2005 screening-level review of TRI and PCS data.

4.2.1 Impact of Relative Source Contribution (RSC)

RSC is the relative source contribution factor that accounts for non-water sources of exposure. The purpose of the RSC is to ensure that the level of a chemical allowed by a criterion or multiple criteria, when combined with other identified sources of exposure common to the population of concern, will not result in exposures that exceed the RfD or point of departure/uncertainty factor (POD/UF). Numerous EPA workgroups have evaluated the appropriateness of factoring in such exposures, and the Agency concludes that it is important for adequately protecting human health. Although EPA has applied RSC to its calculation of water quality criteria, EPA has not previously applied RSC in calculating TWFs and TWPE for its effluent guideline activities.

In order to determine the effect of including the RSC factor in this screening level analysis, EPA compared TWPE calculated with and without the RSC factor for EPA's 2005 annual review [4, 5]. Only 29 chemicals had RSCs of less than 100 percent.

Table 4-1 presents the TWFs and TWPE calculated with and without RSC for the 29 chemicals with an RSC of less than 100 percent. EPA observed the largest absolute change in the TWF for methoxychlor, which increased from 189 without RSC to 198 with RSC. The largest percentage increase in TWF was 62.5 percent for dinitrobutyl phenol. EPA made the following observations for the other 27 chemicals:

- EPA has not developed TWFs for six of the chemicals with RSC factors; therefore, RSC had no impact on the TWPE.

- Six chemicals have TWFs based on cancer slope factors (carcinogenicity) rather than reference doses (non-carcinogenicity) and RSC factors are not included in the calculations based on carcinogenicity

- Four chemicals have human health criteria published in EPA, 2002 that are based on the 1980 methodology which does not include an RSC. [6]

- For five of the remaining thirteen chemicals, the human health component of the TWF is two or more orders of magnitude smaller than the aquatic health component. Changes in the value of the human health component does not make a difference when the TWFs are presented at the precision of three significant digits.

- For most of the remaining eight chemicals, the change in TWF when calculated with and without RSC was negligible.

Table 4-1. Chemicals with RSC Less Than 100 Percent

Chemical	RSC Value	Total Estimated Lbs/Yr	TWF		TWPE		Database
			w/ RSC	w/o RSC	w/ RSC	w/o RSC	
Antimony	40%	13,365	0.012	0.007	163	93.56	PCS
Atrazine	20%	794	2.31	2.31	1,834	1,834	TRI
BHC, Gamma- \ Lindane	20%	592	70.33	70.33	41,641	41,641	PCS
Cadmium	25%	11,249	23.12	22.58	260,060	254,012	PCS
Chlorobenzene	20%	758	0.003	0.003	2.22	2.22	TRI
		1,039	0.003	0.003	3.05	3.05	PCS
Chromium	71%	333,549	0.07570	0.07569	25,249	25,247	PCS
Cyanide	20%	233,276	1.12	1.12	260,552	260,552	PCS

Table 4-1 (Continued)

Chemical	RSC Value	Total Estimated Lbs/Yr	TWF		TWPE		Database
			w/ RSC	w/o RSC	w/ RSC	w/o RSC	
Dalapon	20%	-	-	-	-	-	not reported
Dichlorobenzene, 1,2-	20%	415	0.01	0.01	4.36	4.36	TRI
		1,124	0.01	0.01	11.81	11.81	PCS
Dichlorobenzene, 1,4-	20%	338	0.08	0.08	25.94	25.94	TRI
		1,283	0.08	0.08	98.48	98.48	PCS
Dichloroethene, 1,1-	20%	38.86	0.18	0.18	6.83	6.83	TRI
		625	0.18	0.18	110	110	PCS
Dichloroethene, trans-1,2-	20%	920	0.0001	0.0001	0.08	0.08	PCS
Dichloroethylene, cis-1,2-	20%	25.08	0.007	0.002	0.18	0.04	PCS
Dichloroethylene, NOS	20%	-	-	-	-	-	not reported
Dinoseb\Dinitrobutyl Phenol	20%	142	3.23	1.21	458	172	TRI
		0	3.23	1.21	0.00	0.00	PCS
Diquat dibromide	20%	-	-	-	-	-	not reported
Endothall	20%	-	-	-	-	-	not reported
Endrin	20%	0.00	162	162	0.00	0.00	PCS
Ethylbenzene	20%	13,344	0.001	0.001	18.85	18.85	TRI
		961	0.001	0.001	1.36	1.36	PCS
Glyphosate\Roundup	20%	10,300	0.05	0.04	466	448	PCS
Hexachlorocyclopentadiene	20%	15.78	1.08	1.08	17.00	17.00	TRI
		0	1.08	1.08	0.00	0.00	PCS
Methoxychlor	20%	0.26	198	189	52.56	50.09	PCS
Methylmercury	73%	-	-	-	-	-	not reported
Oxamyl\Vydate	20%	-	-	-	-	-	not reported
Picloram	20%	240,111	2.07412	2.07408	498,021	498,011	TRI
Thallium	20%	1,022	1.03	1.03	1,050	1,050	PCS
Toluene	20%	39,123	0.006	0.006	220	220	TRI
		4,107	0.006	0.006	23.12	23.12	PCS
Trichlorobenzene, 1,2,4-	20%	44.53	0.03	0.03	1.14	1.14	TRI
		946	0.03	0.03	24.13	24.13	PCS
Trichloroethane, 1,1,2-	20%	1,256	0.04	0.04	45.64	45.64	TRI
		928	0.04	0.04	33.75	33.75	PCS

Source: *TRIReleases2002* Database (March 9, 2005); *PCSLoads2002* Database (March 9, 2005).

Although RSC had a large impact on the TWF for methoxychlor and dinitrobutyl phenol relative to other pollutants, its impact on overall TWPE was diminished by the small mass reported discharged. Thus, the impact of including RSC on the calculated TWPE was fairly small. EPA observed that RSC had little to no impact on the total TWPE since the affected pollutants fell into one of the following categories:

- RSC has a significant impact on the chemical's TWF, but the reported discharge quantities of the chemical are relatively small; or

- The reported discharge quantities of the chemical are significant, but the impact of RSC on the chemical's TWF is very negligible.

For the chemicals presented in Table 4-1 that were reported to TRI, EPA compared the chemical's contribution to the total TRI TWPE calculated with RSC and without RSC. Except for dinitrobutyl phenol, RSC did not affect the contribution of the chemical's TWPE to the total TRI TWPE. The impact of RSC on the contribution of the dinitrobutyl phenol TWPE to the total TRI TWPE was very small (0.0015 percent).

Similarly, EPA compared the contribution of PCS-reported chemicals with RSC factors in Table 4-1 to the total PCS TWPE. The total contribution of these chemicals to total PCS TWPE was the same when the TWPE was and without the RSC factor.

Based on the above analysis, EPA concluded that RSC does not have an impact on the TWPE calculated using PCS and TRI data, and selected the RSC TWFs for use in the 2005 Annual Review.

4.2.2 Revisions to TWFs From 2004 Annual Review

In August 2004, EPA published its 2004 Effluent Guidelines Plan. The TWFs used in the development of that plan are referred to in this section as the "August 2004 TWFs." After publication of the 2004 plan, EAD updated its TWFs to incorporate the most recent human and aquatic health criteria and RSC values. These revised TWFs are used in EPA's 2005 review and are referred to as the “December 2004 TWFs.” EPA compared the August 2004 TWFs to the December 2004 TWFs to determine the impact of the TWF revisions on TWPE discharges and Point Source Category rankings for the 2005 review. The TWPE were calculated with the March 9, 2005 versions of the *TRIReleases2002* and *PCSLoads2002* databases. EPA has since updated the databases, but the changes are small and do not affect the overall rankings for EPA’s annual reviews.

Table 4-2 summarizes the impact of the TWF revisions on the pollutants reported to TRI and PCS. TWFs increased for 50 percent of the pollutants reported released in *TRIReleases2002* and decreased for 6 percent of the pollutants. For pollutants reported to *PCSLoads2002*, TWFs increased for 44 percent and decreased for 10.5 percent of the pollutants.

Table 4-2. Summary of the Changes in TWF from August to December 2004

Parameter	Number of Pollutants (%)	
	PCS	TRI
TWF Increased	129 (44%)	171 (53%)
TWF Decreased	31 (10%)	19 (6%)
No change in TWF	43 (15%)	82 (26%)
No TWF (EAD has not developed TWFs for these pollutants)	90 (31%)	49 (15%)
Sum	293	321

Source: *PCSLoads2002* Database (March 9, 2005); *TRIReleases2002* Database (March 9, 2005).

Table 4-3 summarizes the change in total PCS and TRI TWPE calculated with December 2004 TWFs and August 2004 TWFs. Although TWFs increased for a substantial percentage of the pollutants for which discharges were reported, the total TWPE calculated using the December 2004 TWFs decreased by 2.1 million pound equivalents in *PCSLoads2002* and by 19.6 million pound equivalents in *TRIReleases2002*.

Table 4-3. Summary of the Changes in Total TRI and PCS TWPE Using December 2004 TWFs and August 2004 TWFs

Parameter	Change in Total TWPE[1]	
	PCS	TRI
Total TWPE Increase	795,931	972,831
Total TWPE Decrease	(2,918,127)	(20,563,698)
Net Change in TWPE	**(2,122,196)**	**(19,590,867)**

[1]Decreases in TWF and TWPE are indicated by the values enclosed in parentheses.
Source: *PCSLoads2002* Database (March 9, 2005), *TRIReleases2002* Database (March 9, 2005).

Table 4-4 presents the chemicals reported to PCS that showed the largest difference in TWPE calculated using the August 2004 TWFs and December 2004 TWFs. In some cases, the change in TWPE for a specific pollutant resulted from a significant change in the TWF. For others, the change in TWF was small, but the pounds of pollutant discharged were large resulting in a substantial change in TWPE. For example, benzo(a)pyrene showed the biggest change in TWPE, with a decrease of over 2 million pound-equivalents, due to the large decrease in its TWF (4,284 to 101). Manganese showed the next largest decrease in TWPE at over 599,000 pound-equivalents. The manganese TWF, however, decreased by only 0.06. This small TWF revision was magnified by the high manganese discharges reported to PCS, and had a significant impact on PCS TWPE.

Table 4-4. Differences in the Calculated *PCSLoads2002* TWPE, Using August and December 2004 TWFs in PCS

Parameter	Lbs/Yr Reported Discharged	TWF		Change in TWF[1]	TWPE		Change in TWPE[1]
		8/04	12/04		8/04	12/04	
Benzo(a)pyrene	479	4,284	101	(4,183)	2,050,801	48,192	(2,002,609)
Manganese	10,707,140	0.07	0.01	(0.06)	754,136	154,536	(599,600)
Cadmium	11,231	2.61	23.12	20.50	29,335	259,662	230,287
Toxaphene	126	28,749	30,017	1,268	3,613,386	3,772,766	159,380
Polychlorinated Biphenyls (PCBs)	5.22	12,892	34,034	21,141	67,246	177,516	110,270
Nitrogen, Nitrate Total (As N)	19,057,773	0.00006	0.006	0.006	1,182	106,724	105,542

Table 4-4 (Continued)

Parameter	Lbs/Yr Reported Discharged	TWF		Change in TWF[1]	TWPE		Change in TWPE[1]
		8/04	12/04		8/04	12/04	
3,4 Benzofluoran-thene	265	421	30.66	(391)	111,789	8,134	(103,654)
Vanadium	164,871	0.62	0.04	(0.59)	102,587	5,770	(96,816)

[1]Decreases in TWF and TWPE are indicated by the values enclosed in parentheses.
Source: *PCSLoads2002* Database (March 9, 2005).

Table 4-5 presents the chemicals and chemical groups[1] reported to TRI that showed the largest difference in TWPE calculated using the August 2004 TWFs and December 2004 TWFs. PACs showed the largest change in TWPE, with a decrease of 19.7 million resulting from a significant decrease in the TWF for benzo(a)pyrene. Similar to PCS, the manganese and manganese compounds TWPE in TRI decreased significantly even with a change in TWF of only 0.06 because of the large mass (7.2 million pounds per year) reported discharged. Again, even a small revision in the TWF had a significant impact on TWPE because of the high quantities reported discharged. PCBs showed the largest increase in TWF and TWPE of any single chemical reported to TRI, with changes of over 21,000 and 653,000, respectively.

Table 4-5. Differences in the Calculated *TRIReleases2002* TWF, Using August and December 2004 TWFs in TRI

Parameter	2002 Lbs/Yr Reported Discharged	TWF		Change in TWF[1]	TWPE		Change in TWPE[1]
		8/04	12/04		8/04	12/04	
Polycyclic Aromatic Compounds (PACs)[2]	6095	*NA*	*NA*	*NA*	20,065,845	368,997	(19,696,848)
Polychlorinated Biphenyls (PCBs)	30.89	12,892	34,034	21,141	398,300	1,051,434	653,134
Manganese and Manganese Compounds	7,182,017	0.07	0.01	(0.06)	505,851	103,658	(402,193)
Vanadium and Vanadium Compounds	600,477	0.62	0.04	(0.59)	373,630	21,017	(352,614)
Benzidine	53.19	1,047	2,818	1,771	55,668	149,868	94,199

[1]PACs are a chemical group. Facilities reporting to TRI must report the combined mass of PACs discharged; they do not report discharges of individual polycyclic aromatic compounds.

Table 4-5 (Continued)

Parameter	2002 Lbs/Yr Reported Discharged	TWF		Change in TWF[1]	TWPE		Change in TWPE[1]
		8/04	12/04		8/04	12/04	
Arsenic and Arsenic Compounds	102,067	3.47	4.04	0.57	354,106	412,489	58,383
Cadmium and Cadmium Compounds	2,336	2.61	23.12	20.50	6,101	53,998	47,896
1,2,3-Trichloropropane	4,255	0.002	5.26	5.26	8.32	22,400	22,391
Hexachlorobenzene	156	724	1,948	1,224	287,340	303,617	16,277
Heptachlor	1.01	4,094	8,529	4,435	4,135	8,615	4,480

Source: *TRIReleases2002* Database (March 9, 2005).
[1]Decreases in TWF and TWPE are indicated by the values enclosed in parentheses.
[2]In the absence of individual PAC data, EPA used the TWF for benzo(a)pyrene to estimate the TWPE of PACs. The values presented in Table 4-5 reflect this. EPA had concentration data for the individual PACs in petroleum products and the wood preserving chemical creosote, and was therefore able to determine specific TWFs for PACs discharged from petroleum refineries and timber product processing facilities. Thus, EPA uses different TWFs for petroleum refining PACs and wood preserving PACs (EPA made changes to the Pulp, Paper, and Paperboard PACs TWF after the March 9, 2005 version). See Section 3 for additional details on the calculation of category-specific PAC TWFs.
NA - Not applicable.

Table 4-6 presents the point source category rankings based on PCS data using the December 2004 TWFs. The table also presents the rankings based on TWPE calculated with the August 2004 TWFs. Most of the category rankings stayed the same or moved just one or two places. The greatest change in category TWPE was in the Organic Chemicals Plastics and Synthetic Fibers (OCPSF) Point Source Category; use of the updated TWFs resulted in a decrease of over one million TWPE. The OCPSF category rank dropped from 3 to 6. The Explosives Point Source Category showed the biggest change in rank, climbing from 35 to 27 with a TWPE increase of approximately 12,000 pound-equivalents.

Table 4-6. Comparison of PCS Point Source Category Rankings Resulting from TWF Revisions

Point Source Category[1]	TWPE Calculated With:		Rank Based on TWPE Calculated With:	
	8/04 TWFs	12/04 TWFs	8/04 TWFs	12/04 TWFs
Gum and Wood Chemicals	3,639,212	3,819,669	1	1
Steam Electric Power Generation	1,553,062	1,614,291	5	2
Pulp, Paper, and Paperboard (Phase I)	1,581,739	1,575,172	4	3
Iron and Steel Manufacturing	2,691,563	1,420,995	2	4
Phosphate Manufacturing	1,261,308	1,276,142	6	5
Organic Chemicals, Plastics and Synthetic Fibers	1,890,657	620,884	3	6
Ore Mining and Dressing	354,050	406,548	10	7
Nonferrous Metals Manufacturing	432,777	401,975	7	8
Vinyl Chloride and Chlor-alkali	401,562	399,968	8	9
Metal Finishing	373,461	397,583	9	10
Fruits and Vegetable Processing	334,567	342,160	11	11
Petroleum Refining	196,215	198,073	12	12
Plastic Molding and Forming	171,656	172,483	13	13
Fertilizer Manufacturing	128,956	143,795	14	14
Inorganic Chemicals	102,488	139,696	16	15
Textile Mills	119,512	124,085	15	16
Pesticide Chemicals Manufacturing	76,840	91,180	17	17
Meat and Poultry Products	37,305	64,154	23	18
Mineral Mining and Processing	58,474	60,106	18	19
Landfills	43,751	56,102	21	20
Waste Combustors	43,751	56,102	22	21
Pulp, Paper and Paperboard (Phase II)	47,536	53,334	19	22
Pharmaceutical Manufacturing	46,491	50,457	20	23
Electroplating	17,573	19,482	24	24
Sugar Processing	16,123	16,575	25	25
Aluminum Forming	15,998	16,071	26	26
Explosives	2,835	14,452	35	27
Ferroalloy Manufacturing	5,048	6,652	28	28
Nonferrous Metals Forming and Metal Powders	5,787	5,763	27	29
Electrical and Electronic Components	4,957	5,070	29	30

Table 4-6 (Continued)

Point Source Category[1]	TWPE Calculated With:		Rank Based on TWPE Calculated With:	
	8/04 TWFs	12/04 TWFs	8/04 TWFs	12/04 TWFs
Leather Tanning and Finishing	2,619	3,785	36	31
Copper Forming	3,511	3,550	31	32
Porcelain Enameling	3,449	3,478	32	33
Centralized Waste Treaters	3,237	3,429	33	34
Pulp, Paper and Paperboard (Phase III)	3,041	3,045	34	35
Rubber Manufacturing	4,463	2,386	30	36
Cement Manufacturing	2,158	2,107	37	37
Metal Molding and Casting (Foundries)	1,144	1,157	39	38
Canned and Preserved Seafood	251	991	44	39
Timber Products Processing	844	915	40	40
Grain Mills Manufacturing	754	787	41	41
Metal Products and Machinery	723	724	42	42
Coal Mining	1,869	671	38	43
Paving and Roofing Materials (Tars and Asphalt)	367	565	43	44
Aquatic Animal Production Industry	226	304	45	45
Soaps and Detergents Manufacturing	175	258	46	46
Battery Manufacturing	50	88	47	47
Dairy Products Processing	1	45	49	48
Hospital	3	6	48	49
Oil & Gas Extraction	1	1	50	50
Photographic	0	0	51	51
CAFO	0	0	52	52

Sources: *PCSLoads2002* Database (March 9, 2005) and *PCSLoads2000* Database.
[1]Coil Coating (40 CFR Part 465), Paint formulating (40 CFR Part 446), Glass Manufacturing (40 CFR Part 426), Ink Formulating (40 CFR Part 447), Asbestos Manufacturing (40 CFR Part 427), Transportation Equipment Cleaning (40 CFR Part 442), and Carbon Black Manufacturing (40 CFR Part 458) are not included in Table 4-6 due to lack of PCS data.

Table 4-7 similarly presents the category rankings based on TRI data using the December 2004 TWFs and the August 2004 TWFs. The Vinyl Chloride and Chlor-Alkali and Pulp, Paper and Paperboard (Phase I) Point Source Categories[1] did not change in ranking, and remained the top two point source categories with the largest reported discharges. Dioxin discharges account for over 90 percent of the TWPE for these categories, and EPA did not revise the TWFs for the dioxin congeners between August and December 2004.

Table 4-7. Comparison of TRI Point Source Category Rankings Resulting from TWF Revisions

Point Source Category[1]	TWPE Calculated With:		Rank Based On TWPE Calculated With:	
	8/04 TWFs	12/04 TWFs	8/04 TWFs	12/04 TWFs
Vinyl Chloride and Chlor-Alkali	9,638,305	9,851,181	1	1
Pulp, Paper and Paperboard (Phase I)	6,617,771	2,941,498	2	2
Metal Finishing	2,045,551	972,115	6	3
Aluminum Forming	359,758	941,176	12	4
Iron and Steel Manufacturing	2,636,529	833,620	3	5
Steam Electric Power Generation	965,456	804,471	8	6
Organic Chemicals, Plastics and Synthetic Fibers	850,443	644,411	9	7
Petroleum Refining	1,223,705	498,127	7	8
Inorganic Chemicals	398,927	282,570	11	9
Waste Combustors	108,574	220,577	17	10
Landfills	108,574	220,577	16	11
Rubber Manufacturing	2,262,249	173,304	4	12
Pulp, Paper and Paperboard (Phase II)	2,101,898	164,568	5	13
Plastic Molding and Forming	96,957	97,297	18	14
Porcelain Enameling	88,876	88,749	19	15
Timber Products Processing	111,734	86,018	15	16

[1]Because EPA is currently in the process of developing or revising effluent guidelines for discharges from facilities that produce vinyl chloride and/or that produce chlorine by the chlor- alkali process, discharges from facilities with these operations are listed on this tables as a separate category. Effluent guidelines for OCPSF and the Inorganic Chemicals Manufacturing Categories are currently applicable to discharges from these facilities. Similarly, EPA revised the effluent guidelines for mills in two subcategories of the Pulp, Paper, and Paperboard Category. This segment of the category is known as Phase I and discharges for facilities in this segment are listed separately on this table.

Table 4-7 (Continued)

Point Source Category[1]	TWPE Calculated With:		Rank Based On TWPE Calculated With:	
	8/04 TWFs	12/04 TWFs	8/04 TWFs	12/04 TWFs
Nonferrous Metals Forming and Metal Powders	58,434	71,384	21	17
Ore Mining and Dressing	134,660	66,544	14	18
Pulp, Paper and Paperboard (Phase III)	573,075	64,819	10	19
Nonferrous Metals Manufacturing	262,469	63,694	13	20
Metal Molding and Casting (Foundries)	47,157	47,630	22	21
Fruits and Vegetable Processing	38,286	40,136	23	22
Centralized Waste Treaters	27,602	38,055	26	23
Electroplating	34,078	34,851	25	24
Textile Mills	35,357	32,762	24	25
Meat and Poultry Products	21,234	21,870	28	26
Pesticide Chemicals Manufacturing	15,023	18,137	30	27
Gum and Wood Chemicals	87,891	15,611	20	28
Pulp, Paper and Paperboard	12,419	10,746	31	29
Pharmaceutical Manufacturing	20,981	9,578	29	30
Fertilizer Manufacturing	5,938	6,403	35	31
Copper Forming	5,792	5,845	36	32
Grain Mills Manufacturing	3,722	3,882	38	33
Electrical and Electronic Components	4,503	3,681	37	34
Ferroalloy Manufacturing	11,031	3,541	32	35
Leather Tanning and Finishing	9,877	3,399	33	36
Battery Manufacturing	2,786	3,063	40	37
Coal Mining	3,041	2,354	39	38
Cement Manufacturing	2,009	2,009	41	39
Dairy Products Processing	626	633	43	40
Paint Formulating	519	529	45	41
Carbon Black Manufacturing	21,847	514	27	42
Hospital	365	382	46	43
Phosphate Manufacturing	743	377	42	44
Glass Manufacturing	334	338	47	45
Mineral Mining and Processing	322	317	48	46

Table 4-7 (Continued)

Point Source Category[1]	TWPE Calculated With:		Rank Based On TWPE Calculated With:	
	8/04 TWFs	12/04 TWFs	8/04 TWFs	12/04 TWFs
Soaps and Detergents Manufacturing	299	301	49	47
Explosives	249	249	50	48
Metal Products and Machinery	7,866	213	34	49
Sugar Processing	112	112	51	50
Paving and Roofing Materials (Tars and Asphalt)	597	104	44	51
Ink Formulating	99	92	52	52
Canned and Preserved Seafood	35	35	54	53
Coil Coating	37	12	53	54
Asbestos Manufacturing	6	6	55	55

Source: *TRIReleases2002* Database (March 9, 2005).
[1]Aquatic Animal Production (40 CFR Part 451), CAFO (40 CFR Part 412), Oil & Gas Extraction (40 CFR Part 435), Photographic (40 CFR Part 459), and Transportation Equipment Cleaning (40 CFR Part 442) are not included in table 4-7 due to lack of TRI data.

While the rank for Pulp, Paper and Paperboard Phase I did not change, it showed the largest change in TWPE, with a decrease of over 3 million pound-equivalents. This TWPE decrease is primarily due to the change in the TWF for benzo(a)pyrene, used for PACs. The Carbon Black Manufacturing and Metal Products and Machinery Point Source Categories showed the greatest change in rank, dropping 15 places from 27 to 42 and 34 to 49, respectively. These resulted from decreases in TWPE of approximately 20,000 and 1 million pound-equivalents, respectively.

Conclusions

- Changes in TWF had a significant impact on estimated TWPE discharges for certain chemicals and point source category rankings.

- For the total 2002 TRI TWPE, using the updated TWFs resulted in a net decrease of 19.6 million TWPE (63 %).

- For the total 2002 PCS TWPE, using the updated TWFs resulted in a net decrease of 2.1 million TWPE (13.5%).

- For some chemicals (e.g., heptachlor), large changes in TWFs led to only small changes in TWPE because only a few pounds of the chemicals were reported discharged per year.

- For some chemicals (e.g., manganese and nitrate), small changes in TWFs led to large changes in TWPE because a large number of pounds of the chemicals were reported discharged per year.

- Benzo(a)pyrene discharges compiled in PCS had the greatest change, decreasing by 2 million TWPE, reflecting a decrease in TWF from 4,284 to 101.

- PACs discharges reported to TRI had the greatest change, decreasing by 19.7 million TWPE, as a result of the decrease in benzo(a)pyrene TWF.

- In PCS, the greatest change in category TWPE was for OCPSF. Using the updated TWFs reduced the category by over 1 million TWPE.

4.3 <u>Chemicals without TWFs</u>

EAD has not yet developed TWFs for all chemicals reported to TRI and PCS. Table 4-8 lists the chemicals reported to TRI for 2002 that do not have TWFs. The total TRI-reported discharge of the chemicals in Table 4-8 for 2002 is 514,000 pounds. Table 4-9 lists the pollutant parameters reported to PCS for 2002 for chemicals that do not have TWFs. The total PCS-reported non-POTW discharges of the pollutants in Table 4-9 for 2002 is 363 million pounds. Of these pounds, 66% relate to nitrogen- and phosphorus-containing compounds that may act as nutrients.

Eutrophication occurs when nitrogen, phosphorus, and other nutrients in a body of water stimulate the growth of algae. Nutrients flow through ecosystems constantly and eutrophication is a natural process that gradually turns ponds into wetlands and wetlands into meadows. However, when human activity introduces additional nutrients to the natural system, algal growth can become extreme and overwhelm the ecosystem's capacity. This over-fertilization can cause increased turbidity, nuisance, or toxic, algal blooms, changes in biota, and anoxia. All of these effects reduce the level and value of ecosystem services provided by water bodies.

TWFs, however, are not good indicators of the impact of nutrients on water quality. While nutrients may have toxic effects that can be reflected in TWFs, their more important effect on water quality occurs through their promotion of eutrophication. EPA is currently developing alternative approaches to evaluate nutrient discharges for future reviews.

EPA conducted a screening-level analysis of nutrient discharges, which ranked point source categories based on 2002 PCS loads for nitrogen and phosphorus compounds. The results of the analysis showed that OCPSF, Pulp, Paper, and Paperboard, Meat and Poultry Products, and Steam Electric Power Generation ranked in the top five categories both in terms of total phosphorus load and total nitrogen load. EPA has not yet examined the wastewater sources of these discharges, and will conduct a more thorough quality check of the PCS data prior to finalization of the Plan. See DCN 02179 for additional discussion [7].

Table 4-8. TRI-Reported Chemicals with no TWFs

CAS Number	Chemical Name	Total Pounds Released
N503	Nicotine And Salts	288,817
872504	N-Methyl-2-Pyrrolidone	83,791
149304	2-Mercaptobenzothiazole	52,559
7782414	Fluorine	19,434
N583	Polychlorinated Alkanes	19,257
554132	Lithium Carbonate	13,151
8001589	Creosote[1]	11,770
62476599	Acifluorfen, Sodium Salt	6,354
N120	Diisocyanates	5,436
75456	Chlorodifluoromethane	2,632
137417	Potassium N-Methyldithiocarbamate	1,720
28407376	C.I. Direct Blue 218	1,687
924425	N-Methylolacrylamide	1,216
1344281	Aluminum Oxide (Fibrous Forms)	1,167
7697372	Nitric Acid	1,154

Table 4-8 (Continued)

CAS Number	Chemical Name	Total Pounds Released
94360	Benzoyl Peroxide	1,041
64755	Tetracycline Hydrochloride	764
1717006	1,1-Dichloro-1-Fluoroethane	608
26471625	Toluene Diisocyanate (Mixed Isomers)	570
106887	1,2-Butylene Oxide	313
101906	Diglycidyl Resorcinol Ether	133
306832	2,2-Dichloro-1,1,1-Trifluoroethane	46
26628228	Sodium Azide	42
95545	1,2-Phenylenediamine	40
20325400	3,3'-Dimethoxybenzidine Dihydrochloride	35
1649087	1,2-Dichloro-1,1-Difluoroethane	30
75887	2-Chloro-1,1,1-Trifluoroethane	29
75683	1-Chloro-1,1-Difluoroethane	24
79947	Tetrabromobisphenol A	24
764410	1,4-Dichloro-2-Butene	18
2837890	2-Chloro-1,1,1,2-Tetrafluoroethane	14
71751412	Abamectin	13
563473	3-Chloro-2-Methyl-1-Propene	12
2155706	Tributyltin Methacrylate	7.0
52645531	Permethrin	5.0
354234	1,2-Dichloro-1,1,2-Trifluoroethane	5.0
541413	Ethyl Chloroformate	5.0
79221	Methyl Chlorocarbonate	5.0
76153	Monochloropentafluoroethane	5.0
76142	Dichlorotetrafluoroethane (Cfc-114)	5.0
75434	Dichlorofluoromethane	5.0
75729	Chlorotrifluoromethane	5.0
7550450	Titanium Tetrachloride	5.0
354143	1,1,2,2-Tetrachloro-1-Fluoroethane	5.0
1929733	2,4-D Butoxyethyl Ester	4.0
156627	Calcium Cyanamide	2.9
612839	3,3'-Dichlorobenzidine Dihydrochloride	2.8
594423	Perchloromethyl Mercaptan	0.59
29082744	Octachlorostyrene	0.20
75445	Phosgene	0
	Total	**513,968**

Source: *TRIReleases2002_v02*

[1]EAD has not developed a TWF for creosote, which is a chemical mixture. EPA calculated a TWF based on the distribution of constituent chemicals.

Table 4-9. PCS-Reported Pollutants with no TWFs

CAS Number	PRAM Code	Pollutant	Total Annual Pounds (lb/yr)
17778880	00625	Nitrogen, Kjeldahl Total (As N)	136,600,848
7722841	00139	Hydrogen Peroxide	121,529,566
-7723140	PHOSP	Phosphorus	98,247,450
17778880	00605	Nitrogen, Organic Total (As N)	3,442,194
7647145	32017	Sodium Chloride (Salt)	3,024,800
14265442	PO4	Phosphate	511,272
24959679	71870	Bromide (As Br)	101,391
14265453	SO3	Sulfite	11,284
7440611	22708	Uranium, Natural, Total	4,045
7440611	22706	Uranium, Total As U308	1,119
121824	81364	RDX, Total	190
7440031	01139	Columbium, Total	39
999	03604	Total Phenols	29
25323302	81328	Dichloroethene, Total	19
26523648	81611	Trichlorotrifluoro- Ethane	18
29797408	77983	Dichlorotoluene	12
7440699	01017	Bismuth, Total (As Bi)	8.6
115286	39129	Chlorendic Acid	6.5
7440053	01210	Palladium, Total (As Pd)	2.7
95169	81512	Benzothiazole	0.35
7553562	71868	Iodine Total	0.013
103651	77224	N-Propylbenzene	0.0031
		Total	**363,474,294**

Source: *PCSLoads2002_v02*

4.4 References

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2. Zipf. 2003. Lynn Zipf. Revisions to EAD's Toxic Weighting Factor Methodology Parameters. Memorandum to 304(m) Record (EPA Docket Number OW-2003-0074). December 3. DCN 02108.

3. U.S. EPA, Office of Water. *Toxic Weighting Factor Development in Support of CWA 304(m) Planning Process*. June 2005. DCN 02013.

4. TWF_12.21.04.xls. DCN 02286

5. TWF_12.21.04_no_RSC.xls. DCN 02286

6. U.S. EPA. 2002. *National Recommended Water Quality Criteria: 2002*. Human Health Criteria Calculation Matrix. EPA-822-R-02-012. November. DCN 02114.

7. ERG. 2005. Point Source Category Rankings by Nitrogen and Phosphorus Loads Calculated using 2002 PCS Data. Memorandum to 304(m) Record (EPA Docket Number OW-2004-032; DCN: 02179). August 9. DCN 02179.

5.0 IDENTIFICATION OF POINT SOURCE CATEGORIES

EPA develops effluent limitations guidelines and pretreatment standards (ELGs) for specific categories of industrial dischargers; to date, EPA has developed ELGs for 56 point source categories. The categories, which may be divided into subcategories, are generally defined by the products made or services rendered and the processes used to make these products or provide those services. The purpose of EPA's screening-level analysis is to use existing environmental data in PCS and TRI to investigate discharges from industrial point source categories and prioritize these categories for additional review. Facilities with data in PCS and TRI are identified by a four-digit Standard Industrial Classification (SIC) code. Thus, to use the PCS and TRI data to estimate the pollutants discharged by each industrial point source category, EPA has linked each four-digit SIC code to an appropriate point source category, which is summarized in the "SIC/Point Source Category (PSC) Crosswalk" table (Table 5-A in Attachment 5). This crosswalk is a key element of both the *PCSLoads2002* and *TRIReleases2002* databases.

The remainder of this section is divided into the following subsections:

- Section 5.1 - Background;
- Section 5.2 - SIC Codes Related to Existing Point Source Categories;
- Section 5.3 - Potential New Subcategories of Existing Point Source Categories;
- Section 5.4 - Potential New Point Source Categories;
- Section 5.5 - Category Not Identifiable; and
- Section 5.6 - References.

5.1 Background

The SIC system is the statistical classification standard underlying all establishment-based federal economic statistics classified by industry [1]. Although it was developed by the Office of Management and Budget, the SIC system is used by other government agencies, including EPA, to promote data comparability. In the SIC system, each establishment is classified according to its primary economic activity, which is determined by its principal product or group of products. An establishment may have activities in more than one SIC code. Some data collection organizations (e.g., the economic census) assign one SIC code per establishment. TRI allows reporting facilities to identify their primary SIC code and up to five additional SIC codes. PCS allows one four-digit code, reflecting the principal activity causing the discharge at each facility. For a given facility, the SIC code in PCS may differ from the primary SIC code identified in TRI.

The North American Industry Classification System (NAICS) has replaced the SIC system. The 1997 and 2002 Economic Census were developed using NAICS codes. On March 21, 2003 EPA proposed to convert the TRI reporting requirements from SIC codes to NAICS codes. This proposed change is not yet effective, however, nor has EPA announced plans to change its PCS database to the NAICS codes. Because EPA's TRI and PCS data for 2002 continued to be classified by SIC code, EPA's 2005 screening-level analysis was conducted with SIC codes. Census data reported by NAICS codes were translated to SIC codes using Census' NAICS/SIC code bridges.

Most point source categories are not defined by SIC code, but by a description of the wastewater pollutant generating activity. Regulations for an individual point source category may apply to one SIC code, multiple SIC codes, a portion of the facilities in an SIC code, or a portion of the discharges from facilities in an SIC code. In particular, point source categories related to services, such as centralized, commercial wastewater treatment, apply to discharges from facilities that report activities in several different SIC codes.

During its 2005 screening-level review, EPA looked at the SIC codes reported by facilities with discharge information in PCS and TRI and divided the SIC codes into four groups:

- *Existing Point Source Category* - discharges from most facilities in the SIC code meet the applicability requirements of an existing point source category.

- *Potential New Subcategory of an Existing Point Source Category* - discharges from most facilities in the SIC code may be considered part of a potential new subcategory of an industrial category subject to an existing ELG. EPA based this determination on the similarity of processes and operations at facilities in the SIC code to those at facilities in the existing category.

- *Potential New Point Source Category* - discharges from facilities in the SIC code are similar to each other but do not meet the applicability requirements of and are not similar to a point source category subject to an existing ELG.

- *Category Not Identifiable* - facilities in the SIC code engage in a variety of industrial operations and likely meet the applicability requirements of several existing point source categories. However, EPA is not able to identify a coherent stand-alone point source category based on the SIC code description.

Most SIC codes reported by facilities with discharge information in PCS and TRI meet the applicability of an existing point source category and fall into the first group. Each of the groups is described in more detail below.

5.2 SIC Codes Related to Existing Point Source Categories

As part of its 2003 and 2004 screening-level analyses, EPA related SIC codes to existing point source categories. During the development of the existing ELGs for these categories, EPA studied demographic and economic data for the facilities to which the ELGs apply. These data were classified by SIC code, Using the documentation of the development of the existing ELGs, EPA developed the relationship, or "crosswalk," between SIC codes and point source categories. This crosswalk is included as Table 5-A in Attachment 5.

Because most point source categories are not defined by SIC code, the relationship between SIC code and point source category is not a one-to-one correlation. A single SIC code may include facilities in more than one point source category, so associating an SIC code with only one category may be an over simplification. Also, many facilities have operations subject to more than one point source category. Further, facilities in some categories cannot be identified by SIC code. This subsection discusses how EPA reconciled these inconsistencies to cross-reference appropriate point source categories to specific SIC codes.

5.2.1 SIC Codes Counted in More than One Point Source Category

A single SIC code may include facilities subject to more than one point source category. For example, SIC code 3357, Drawing and Insulating of Nonferrous Wire, includes facilities that draw wire made from aluminum, copper, and other nonferrous metals such as nickel and silver. Depending on the type of metal, ELGs from three categories may apply to the discharges from these operations. EPA included the loads discharged by facilities in SIC code 3357 in each of the three applicable categories: aluminum forming, copper forming, and nonferrous metals forming. In order to make a "worst case" estimate of the TWPE discharged by every category, EPA included the loads from SIC codes associated with multiple point source categories in the load for each associated category, double- or triple-counting the loads from these SIC codes. Table 5-1 presents the SIC codes associated with multiple point source categories, and identifies the applicable point source categories.

Table 5-1. SIC Codes Counted in Multiple Point Source Categories

SIC Code	SIC Description	Applicable Point Source Categories
3353	Aluminum Sheet, Plate, and Foil	Aluminum Forming (40 CFR 467) and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3357	Drawing and Insulating of Nonferrous Wire	Aluminum Forming (40 CFR 467), Copper Forming (40 CFR 468), and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3363	Aluminum Die Casting	Aluminum Forming (40 CFR 467) and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3431	Metal Sanitary Ware	Porcelain Enameling (40 CFR 466) and Metal Finishing (40 CFR 433)
3463	Nonferrous Forgings	Aluminum Forming (40 CFR 467), Copper Forming (40 CFR 468), and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3469	Metal Stampings, NEC	Porcelain Enameling (40 CFR 466) and Metal Finishing (40 CFR 433)
3479	Metal Coating, Engraving, and Allied Services	Porcelain Enameling (40 CFR 466) and Metal Finishing (40 CFR 433)
3631	Household Cooking Equipment	Porcelain Enameling (40 CFR 466) and Metal Finishing (40 CFR 433)
3632	Household Refrigerators and Freezers	Porcelain Enameling (40 CFR 466) and Metal Finishing (40 CFR 433)
3633	Household Laundry Equipment	Porcelain Enameling (40 CFR 466) and Metal Finishing (40 CFR 433)
3639	Household Appliances, NEC	Porcelain Enameling (40 CFR 466) and Metal Finishing (40 CFR 433)
4953	Refuse Systems	Landfills (40 CFR 445) and Waste Combustors (40 CFR 444)

During its preliminary and detailed reviews of prioritized categories, EPA reviews available information about pollutant loads from the individual facilities EPA assigned to each category. For example, for the 2005 annual review, EPA located information about facilities in SIC codes associated both with the Porcelain Enameling and Metal Finishing Point Source Categories. EPA used this information to determine the category most likely to apply to each facility’s discharge [2].

5.2.2 SIC Codes Divided Among Point Source Categories

As noted previously, some SIC codes include facilities subject to more than one category. EPA was able to assign discharges from some of these SIC codes to the appropriate category and avoid double-counting. Some of these assignments were made at the facility level, while others were made at the pollutant level, as discussed below.

5.2.2.1 Facility-Level Point Source Category Assignment

For some SIC codes that include facilities subject to guidelines from more than one point source category, EPA was able to assign each facility to the category that applied to its discharges. When publically available information was not clear, EPA telephoned the facility TRI or PCS contact to understand which facility operations were the source of reported wastewater discharges. These contacts are included in Docket # OW-2004-0032. EPA reviewed information available about each facility to determine which point source category applied to the facility's operations. EPA assigned the following SIC codes to point source categories at the facility level:

- *SIC 2048 (Prepared Feed and Feed Ingredients for Animals and Fowl, Except Dogs and Cats)* - The SIC/Point Source Category Crosswalk assigns this SIC code to the Grain Mills Manufacturing, Meat and Poultry Products, and Pharmaceutical Manufacturing point source categories. After review of available information, EPA identified facilities that generated wastewater from grain mills manufacturing operations and assigned an SIC code of 2048G to these facilities. Similarly, EPA assigned an SIC code of 2048M to facilities generating wastewater to which the Meat and Poultry Products guidelines apply. EPA assigned an SIC code of 2048Ph to facilities generating wastewater to which the Pharmaceuticals Manufacturing guidelines apply.

- *SIC 2819 (Industrial Inorganic Chemicals, NEC)* - The SIC/Point Source Category Crosswalk assigns this SIC code to the Inorganic Chemicals Manufacturing, Nonferrous Metals Manufacturing, and Phosphate Manufacturing point source categories. After review of available information, EPA identified facilities that generated wastewater from nonferrous metals manufacturing operations and assigned an SIC code of 2819N to them. Similarly, EPA assigned an SIC code of 2819Ph to facilities generating wastewater to which the Phosphate Manufacturing guidelines apply. The SIC code for Inorganic Chemicals Manufacturers remained 2819.

- *SIC 2874 (Phosphatic Fertilizers)* - The SIC/Point Source Category Crosswalk assigns this SIC code both to the Phosphate Manufacturing and to the Fertilizer Manufacturing Point Source Categories. After review of available information, EPA identified facilities that generated wastewater to which the Fertilizer Manufacturing guidelines apply. EPA assigned an SIC code of 2874F to these facilities. The SIC code for Phosphate Manufacturers remained 2874.

5.2.2.2 Pollutant-Level Point Source Category Assignment

For most facilities that discharge wastewater subject to more than one point source category, EPA was not able to divide the pollutant discharges between applicable point source categories. Two exceptions where EPA was able to assign wastewater discharges of certain chemicals to the appropriate point source category are discussed below.

OCPSF/Pesticides

The Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Point Source Category regulations may apply to discharges from facilities in SIC Codes 2821, 2823, 2824, 2842, 2844, 2865, 2869, 2891, 2899, and 5169. Some facilities in these SIC codes manufacture and/or formulate pesticides as well as other organic chemicals. Discharges from pesticide operations are controlled by regulations for the Pesticide Chemicals Point Source Category (40 CFR 455). For the screening-level analysis of discharges from existing categories, EPA therefore subtracted all pesticide discharges from OCPSF and counted them as discharges from the Pesticides Chemicals Point Source Category.

EPA created a table containing a list of pesticides and their CAS numbers in order to identify the pesticide releases from the OCPSF Point Source Category. In developing the list of pesticides, EPA started with the list of 272 pesticide active ingredients that was created during the most recent pesticides rulemaking. Some of the pesticides in the list of 272 active ingredients were multiple compounds, for example “2,4 D salts and esters” and “organo-tin pesticides,” and were not identified by CAS number. EPA identified individual chemicals and CAS numbers for active ingredients in these groups and added them to the pesticides list. All of the chemicals identified from the list of 272 pesticide active ingredients were included in the pesticides list, except for biphenyl and dichlorobenzene. Biphenyl and dichlorobenzene were not included because EPA determined that OCPSF facilities use these chemicals for specific manufacturing uses not related to pesticides.

EPA also identified pesticide active ingredients, not included in the list of 272 developed during the most recent pesticides rulemaking, by using the 1988 FIFRA and TSCA Enforcement System (FATES) Database and a list created in 2003 by the Office of Pesticide Programs (OPP). EPA combined the two lists and determined which of the pesticide active ingredients were reported discharged in the TRI and PCS databases in 2002. For chemicals that were reported discharged, EPA determined whether the chemical had significant manufacturing uses not related to pesticide active ingredients. Chemicals, such as acrolein, trichlorofuoromethane, silver, and sulfuric acid, whose primary use was non-pesticide-related were not added to the list, while chemicals whose primary purpose was pesticide-related were added to the list. The list of chemicals reported in the TRI and PCS databases that EPA considered pesticides for the purpose of its screening-level analysis of discharges from existing categories contains 394 chemicals. This list can be found *TRIReleases2002_v02*.

MP&M/Metal Finishing

Regulations for the Metal Finishing (40 CFR Part 433) Point Source Category may apply to discharges from facilities in 179 SIC codes for which discharges were reported in TRI or PCS in 2002. Regulations for the Metal Products and Machinery (MP&M) (40 CFR Part 438) Point Source Category may apply to some of the pollutants directly discharged by facilities in 136 of these SIC codes. The final MP&M rule at §438.1(b) specifically excludes both metal-bearing wastewaters and wastewaters subject to other effluent guidelines (e.g., Metal Finishing).

For the purpose of its screening-level analysis of discharges from existing categories, EPA developed methodologies to apportion pollutant loads between the MP&M and Metal Finishing Point Source Categories.

The MP&M rule as promulgated regulates oil and grease (O&G) and total suspended solids (TSS) in direct discharges from certain facilities that generate oily wastewater; it does not specifically regulate any TRI chemicals. Therefore, to determine which TRI releases to count as MP&M discharges, EPA created a list of TRI chemicals that would be indirectly controlled by the MP&M rule (i.e., chemicals that would be removed from wastewater due to treatment for O&G and TSS). EPA used a list of organic "pollutants of concern" it had developed for the MP&M rule and identified 48 TRI chemicals and chemical categories that were also MP&M pollutants of concern. EPA used a similar approach to identify 103 PCS parameters, including O&G and TSS, that were apportioned to the MP&M category in the *PCSLoads2002* database. For the 2005 screening-level analysis, EPA counted all direct discharges of these pollutants from the 136 MP&M SIC codes as MP&M discharges. Discharges of all other chemicals, as well as releases from indirect dischargers, were counted as Metal Finishing discharges. EPA believes that the identified pollutants are those that are most likely associated with the non-metal bearing oily waste streams subject to the MP&M regulations, and that this apportionment, which avoids double counting pollutant loads, is a reasonable approach for screening-level analysis of discharges from existing categories.

Table 5-B in Attachment 5 lists the 88 organic "pollutants of concern" for the MP&M rule. Of these 88 pollutants, 45 chemicals are on the list of 612 TRI chemicals. EPA identified these 45 chemicals as "Controlled by MP&M."

EPA examined the remaining 43 MP&M chemicals that did not have a TRI match (based on CAS number) to see if they fell within a TRI compound category, or if they should be considered representative of a TRI chemical. If EPA identified an MP&M chemical as belonging to a TRI compound category, the entire category was considered MP&M for the TRI analysis, because EPA could not identify what portion of the mass of the category was attributable to the MP&M chemical. Further, the chemicals in a compound category have similar physical and chemical properties and would be controlled by the wastewater treatment for O&G and TSS necessary to comply with the MP&M regulations. Based on review of the remaining 43 chemicals, EPA added the following three TRI compound categories to the list of MP&M chemicals, bringing the total to 48:

- *Polycyclic aromatic compounds* - based on listing fluoranthene as an MP&M-controlled chemical;
- *p-Xylene* - based on listing o+p xylene as an MP&M-controlled chemical; and
- *Xylene, mixed isomers* - based on listing several xylene isomers as MP&M-controlled chemicals.

Attachment 5-C lists the 48 TRI chemicals EPA counted as MP&M releases for direct discharges from the 136 MP&M SIC codes.

For the 2004 Annual Review of PCS data, EPA allocated <u>all</u> organic chemical releases from the 136 MP&M SIC codes to the MP&M Point Source Category and releases of all other chemicals to the Metal Finishing category. This method was incorrect because it included chemicals that are not on the list of 88 MP&M organic chemicals (including dioxin compounds and polychlorinated biphenyls) in the MP&M Point Source Category.

Therefore, for the 2005 Annual Review, EPA changed the PCS methodology to be consistent with the TRI methodology, as described above. EPA matched PCS parameters to the list of 88 MP&M chemicals using CAS numbers and the SUPERCAS table (described in Section 2.1.2).

Using the "SUPERCAS" table (see Section 2.1.2) , EPA matched 104 pollutant parameters to the list of 88 organic "pollutants of concern" for the MP&M rule that are discharged by facilities in the 136 MP&M SIC codes. EPA identified these 104 pollutant parameters as "Controlled by MP&M." Attachment 5-D presents the list of PCS parameters allocated to MP&M for the 2005 Annual Review.

5.2.3 Categories Not Identified By SIC Code (Centralized Waste Treaters)

The SIC/Point Source Category Crosswalk does not assign any SIC codes to the Centralized Waste Treaters (CWT) Point Source Category (40 CFR Part 437). Furthermore, the applicability of the CWT regulations is not defined by SIC codes. For the screening-level review of TRI and PCS data, EPA identified facilities as CWTs during its review of other categories. In the SIC/Point Source Category Crosswalk, EPA assigned these CWT facilities a placeholder SIC code of "CWT" and linked it to Part 437.

5.3 <u>Potential New Subcategories of an Existing Point Source Category</u>

As discussed in Section 5.2, EPA developed a crosswalk between SIC codes and existing point source categories. The crosswalk, included as Table 5-A in Attachment 5, identifies SIC codes that EPA associated with the applicability of an existing guideline. The grouping for these SIC codes is identified as "PSC". The crosswalk also identifies SIC codes not associated with the applicability of an existing guideline. In Table 5-A, the grouping for these SIC codes is identified as "SIC".

EPA reviewed facilities with discharge data in TRI and/or PCS that have SIC codes and are not clearly subject to existing ELGs. During its 2004 annual review, EPA determined that four of these SIC codes were potential new subcategories of the OCPSF Category (SIC codes 2842, 2844, 2891, and 2899) and one SIC code was a potential new subcategory of the Petroleum Refining Category (SIC code 5171). EPA continued to identify those five SIC codes as such for the 2005 review. As discussed in Section 5.4 of this report, EPA reevaluated its classification of SIC codes 2085, 2082, 2075, 8071, and 8072 and finds that they may be subcategories of potential new point source categories.

EPA reviewed information about facilities with discharge data in TRI and/or PCS that have SIC codes and are not clearly subject to existing ELGs to determine if, because of similarity of operations and wastewater characteristics, the facilities (and by extension discharges from other facilities in the SIC codes with which they were identified) should be considered as potential new subcategories of categories subject to existing ELGs. For this review, EPA used information about facilities that reported wastewater discharges to TRI or for which discharge data were available from PCS. First, EPA carefully reviewed the applicability of existing ELGs and determined that wastewaters from operations in these SIC codes were not subject to existing ELGs. Next, EPA evaluated whether the type of industrial activities carried out by the reporting facilities might be appropriately addressed as a potential new subcategory of an existing category. EPA compared the processes, operations, wastewaters, and pollutants addressed by the existing categories to the processes, operations, wastewaters, and pollutants of the potential new subcategory. As a result of this review, EPA concluded the processes, operations, wastewaters, and pollutants of facilities in the SIC Codes listed Table 5-2 with data in TRI or PCS are similar to those of the existing categories listed in Table 5-2.

This crosswalk addresses only potential new subcategories that are identified by SIC codes of facilities with discharge data in TRI and/or PCS. Some potential new subcategories, such as coal bed methane, a potential new subcategory of the Coal Mining Category, are not identified by SIC code and are therefore not addressed by the crosswalk methodology.

Table 5-2. SIC Codes for Facilities with Discharge Data in TRI and/or PCS that are Potential New Subcategories of Existing Point Source Categories

SIC Code[a]	SIC Description	40 CFR Part	Point Source Category
2322	Men's & Boys Underwear & Night	410	Textile mills
2396	Automotive Trimmings, Apparel	410	Textile mills
2399	Fabricated Textile Products NEC	410	Textile mills
2431	Millwork	429	Timber products processing
2434	Wood Kitchen Cabinets	429	Timber products processing
2439	Structural Wood Members, Nec	429	Timber products processing
2511	Wood Household Furn, Exc Uphol	429	Timber products processing
2512	Wood Household Furn, Upholster	429	Timber products processing
2517	Wood TV, Radio, Phono Cabinet	429	Timber products processing
2521	Wood Office Furniture	429	Timber products processing

Table 5-2 (Continued)

SIC Code[a]	SIC Description	40 CFR Part	Point Source Category
2541	Wood Parti,shelf,lock,etc	429	Timber products processing
2653	Corrugated/solid Fiber Boxes	430	Pulp, paper and paperboard
2655	Fiber Cans, Tubes,drums & Prod	430	Pulp, paper and paperboard
2656	Sanitary Food Containers	430	Pulp, paper and paperboard
2657	Folding Paperboard Boxes	430	Pulp, paper and paperboard
2671	Coated & Laminated Packaging	430	Pulp, paper and paperboard
2672	Coated & Laminated, Nec	430	Pulp, paper and paperboard
2674	Bags,uncoatd Paper & Multiwall	430	Pulp, paper and paperboard
2679	Conv Paper & Paperbrd Products	430	Pulp, paper and paperboard
2835	Diagnostic Substances	439	Pharmaceutical manufacturing
2836	Biologcal Prod, Except Diagnos	439	Pharmaceutical manufacturing
2842	Specialty Cleaning, Polishing	414	Organic chemicals, plastics and synthetic fibers
2843	Surf Active Agent, Fin Agents	417	Soaps and detergents manufacturing
2844	Perfumes,cosmetics,toilet Prep	414	Organic chemicals, plastics and synthetic fibers
2891	Adhesives and Sealants	414	Organic chemicals, plastics and synthetic fibers
2899	Chemicals & Chem Prep, Nec	414	Organic chemicals, plastics and synthetic fibers
2992	Lubricating Oils and Greases	419	Petroleum refining
2999	Prod of Petroleum & Coal, Nec	419	Petroleum refining
3231	Glass Prod Made of Purch. Glas	426	Glass manufacturing
3251	Brick and Structural Clay Tile	436	Mineral Mining and Processing
3253	Ceramic Wall and Floor Tile	436	Mineral Mining and Processing
3255	Clay Refractories	436	Mineral Mining and Processing
3259	Structural Clay Products Nec	436	Mineral Mining and Processing
3261	Vitreous China Plumbing Fixtur	436	Mineral Mining and Processing
3262	Vit China Table & Ktchn Articl	436	Mineral Mining and Processing
3263	Fine Earthenware	436	Mineral Mining and Processing
3264	Porcelain Electrical Supplies	436	Mineral Mining and Processing
3269	Pottery Products, Nec	436	Mineral Mining and Processing
3272	Concrete Prod Exc Blck & Brick	411	Cement manufacturing
3273	Ready-mixed Concrete	411	Cement manufacturing
3274	Lime	436	Mineral Mining and Processing
3291	Abrasive Products	436	Mineral Mining and Processing

Table 5-2 (Continued)

SIC Code[a]	SIC Description	40 CFR Part	Point Source Category
3295	Mine & Earths, Ground or Treat	436	Mineral Mining and Processing
3297	Nonclay Refractories	436	Mineral Mining and Processing
3299	Nonmetallic Mineral Prod, Nec	436	Mineral Mining and Processing
4011	Railroads, Line Haul Operating	433/438	Metal Finishing/Metal Products and Machinery
4013	Railroad Swtching & Term Estab	433/438	Metal Finishing/Metal Products and Machinery
4612	Crude Petroleum Pipelines	419	Petroleum refining
4939	Combination Utilities, Nec	423	Steam electric power generation
4961	Steam & Air-conditioning Sup	423	Steam electric power generation
5032	Brick, Stone & Relat Materials	436	Mineral Mining and Processing
5159	Farm-product Raw Materials	406	Grain mills manufacturing
5169	Chemicals and Allied Products	414	Organic chemicals, plastics and synthetic fibers
5171	Petroleum Bulk Stations & Term	419	Petroleum refining
7692	Welding Repair	433	Metal Finishing

[a]Only SIC codes of facilities with wastewater discharge data in TRI and/or PCS are presented in this table.

For the 2005 screening-level analysis, EPA included pollutant loadings from the potential new subcategories in their respective parent industrial category totals (e.g., the pollutant loadings from petroleum bulk stations and terminals (SIC 5171) were included in the pollutant loadings for the Petroleum Refining point source category (40 CFR 419)). Table 5-3 shows the point source categories with potential new subcategories and the total TWPE of the potential new subcategory. The total TWPE was calculated by summing the TRI TWPE and PCS TWPE for each SIC code that is a potential new subcategory. The new subcategory total TWPE is also presented as a percent of the total category TWPE. In general, the new subcategory TWPE is a very small percentage of the total category TWPE; however, the new subcategory for soaps and detergents manufacturing accounts for 75 percent of the category TWPE.

Table 5-3. Pollutant Loadings From SIC Codes for Facilities with Discharge Data in TRI and/or PCS that are Potential New Subcategories

40 CFR Part	Point Source Category	SIC Code[1]	SIC Description	Combined TRI and PCS TWPE	Percent of Total Category TWPE
406	Grain mills manufacturing	5159	Farm-product Raw Materials	189	3.90
406	Grain mills manufacturing			189	3.90
410	Textile mills	2322	Men's & Boys Underwear & Night	2.55	0.002
410	Textile mills	2396	Automotive Trimmings, Apparel	0.12	<0.001
410	Textile mills	2399	Fabricated Textile Products Nec	0.08	<0.001
410	Textile mills			2.74	0.002
411	Cement manufacturing	3272	Concrete Prod Exc Blck & Brick	8.2	0.20
411	Cement manufacturing	3273	Ready-mixed Concrete	7.4	0.18
411	Cement manufacturing			15.6	0.38
414	Organic chemicals, plastics and synthetic fibers	2842	Specialty Cleaning, Polishing	1,048	0.04
414	Organic chemicals, plastics and synthetic fibers	2844	Perfumes,cosmetics,toilet Prep	6,909	0.30
414	Organic chemicals, plastics and synthetic fibers	2891	Adhesives and Sealants	199	0.008
414	Organic chemicals, plastics and synthetic fibers	2899	Chemicals & Chem Prep, Nec	59,070	2.53
414	Organic chemicals, plastics and synthetic fibers	5169	Chemicals and Allied Products	587	0.03
414	Organic chemicals, plastics and synthetic fibers			67,813	2.90
417	Soaps and detergents manufacturing	2843	Surf Active Agent, Fin Agents	1,694	75.18
417	Soaps and detergents manufacturing[2]			1,694	75.18
419	Petroleum refining	2992	Lubricating Oils and Greases	3,836	0.57
419	Petroleum refining	2999	Prod of Petroleum & Coal, Nec	1,915	0.29
419	Petroleum refining	4612	Crude Petroleum Pipelines	247	0.04
419	Petroleum refining	5171	Petroleum Bulk Stations & Term	1,551	0.23
419	Petroleum refining			7,550	1.13
423	Steam electric power generation	4939	Combination Utilities, Nec	0.003	<0.01

Table 5-3 (Continued)

40 CFR Part	Point Source Category	SIC Code[1]	SIC Description	Combined TRI and PCS TWPE	Percent of Total Category TWPE
423	Steam electric power generation	4961	Steam & Air-conditioning Sup	2,386	0.10
423	Steam electric power generation			2,386	0.10
426	Glass manufacturing	3231	Glass Prod Made of Purch. Glas	125	3.22
426	Glass manufacturing			125	3.22
429	Timber products processing	2431	Millwork	3.77	0.005
429	Timber products processing	2434	Wood Kitchen Cabinets	0.04	<0.001
429	Timber products processing	2439	Structural Wood Members, Nec	2.24	0.003
429	Timber products processing	2511	Wood Household Furn, Exc Uphol	0.50	0.001
429	Timber products processing	2512	Wood Household Furn, Upholster	0.0012	<0.001
429	Timber products processing	2517	Wood Tv, Radio, Phono Cabinet	0.0012	<0.001
429	Timber products processing	2521	Wood Office Furniture	0.0019	<0.001
429	Timber products processing	2541	Wood Parti,shelf,lock,etc	1.01	0.001
429	Timber products processing			7.57	0.010
430	Pulp, paper and paperboard	2653	Corrugated/solid Fiber Boxes	25	<0.01
430	Pulp, paper and paperboard	2655	Fiber Cans, Tubes,drums & Prod	447	0.01
430	Pulp, paper and paperboard	2656	Sanitary Food Containers	0.11	<0.01
430	Pulp, paper and paperboard	2657	Folding Paperboard Boxes	0.18	<0.01
430	Pulp, paper and paperboard	2671	Coated & Laminated Packaging	20,596	0.44
430	Pulp, paper and paperboard	2672	Coated & Laminated, Nec	185	<0.01
430	Pulp, paper and paperboard	2674	Bags,uncoatd Paper & Multiwall	0.002	<0.01
430	Pulp, paper and paperboard	2679	Conv Paper & Paperbrd Products	0.003	<0.01
430	Pulp, paper and paperboard			21,253	0.46
433	Metal Finishing	4011	Railroads, Line Haul Operating	205	0.01
433	Metal Finishing	4013	Railroad Swtching & Term Estab	205	0.01
433	Metal Finishing	7692	Welding Repair	0.0002	<0.01

Table 5-3 (Continued)

40 CFR Part	Point Source Category	SIC Code[1]	SIC Description	Combined TRI and PCS TWPE	Percent of Total Category TWPE
433	Metal Finishing			410	0.03
436	Mineral Mining and Processing	3251	Brick and Structural Clay Tile	12	0.02
436	Mineral Mining and Processing	3253	Ceramic Wall and Floor Tile	21	0.03
436	Mineral Mining and Processing	3255	Clay Refractories	201	0.32
436	Mineral Mining and Processing	3259	Structural Clay Products Nec	0.010	<0.01
436	Mineral Mining and Processing	3261	Vitreous China Plumbing Fixtur	14	0.02
436	Mineral Mining and Processing	3262	Vit China Table & Ktchn Articl	38	0.06
436	Mineral Mining and Processing	3263	Fine Earthenware	0.33	<0.01
436	Mineral Mining and Processing	3264	Porcelain Electrical Supplies	246	0.39
436	Mineral Mining and Processing	3269	Pottery Products, Nec	24	0.04
436	Mineral Mining and Processing	3274	Lime	292	0.46
436	Mineral Mining and Processing	3291	Abrasive Products	52	0.08
436	Mineral Mining and Processing	3295	Mine & Earths, Ground or Treat	293	0.47
436	Mineral Mining and Processing	3297	Nonclay Refractories	1,350	2.15
436	Mineral Mining and Processing	3299	Nonmetallic Mineral Prod, Nec	23	0.04
436	Mineral Mining and Processing	5032	Brick, Stone & Relat Materials	126	0.20
436	Mineral Mining and Processing			2,692	4.29
438	Metal Products and Machinery	4011	Railroads, Line Haul Operating	-	-
438	Metal Products and Machinery	4013	Railroad Swtching & Term Estab	-	-
438	Metal Products and Machinery			-	-
439	Pharmaceutical manufacturing	2835	Diagnostic Substances	1.9	0.003
439	Pharmaceutical manufacturing	2836	Biologcal Prod, Except Diagnos	44	0.074
439	Pharmaceutical manufacturing			46	0.077

Source: *TRIReleases2002_v02* and *PCSLoads2002_v02*.
[1]Only SIC codes for facilities with wastewater discharge data presented in TRI and/or PCS are presented in this table.
[2]The TWPE for this category without SIC 2843 is 301 lb-eq/yr.

5.4 Potential New Point Source Categories

As EPA developed the crosswalk between SIC codes and existing point source categories described in Sections 5.2 and 5.3, it reviewed information about facilities with discharge data in TRI and/or PCS that have SIC Codes and are not clearly subject to existing ELGs. EPA identified several SIC codes for which it determined that the processes, operations, wastewaters, and pollutants were not similar to those of existing categories, but that represented a coherent group, and thus should be considered as part of potential new point source categories.

CWA section 304(m)(1)(B) requires EPA to identify categories of sources discharging toxic and nonconventional pollutants in nontrivial amounts, for which effluent guidelines under Section 304(b)(2) and new source performance standards under Section 306 have not yet been published. These requirements apply to facilities discharging wastewater directly to receiving streams. Although EPA has identified several SIC codes that could be considered as potential new point source categories for effluent guidelines, it has not yet determined if their discharges of toxic and nonconventional pollutants are trivial or nontrivial. The potential new point source categories that EPA has identified, that are comprised of both direct and indirect dischargers, are discussed in Section 5.4.1.

EPA has additional obligations under CWA Section 304(g) and 307(b) to develop pretreatment standards for new categories of indirect dischargers. In this annual review, EPA therefore considered whether to establish pretreatment standards for potential new point source categories are comprised entirely of almost entirely of indirect dischargers, as discussed in Section 5.4.2.

The identification of potential new point source categories by this methodology is limited to new categories that are identified by the SIC codes of facilities with discharge data in TRI and/or PCS. Some potential new categories, such as Airport Deicing, a potential new category EPA identified in its 2004 ELG Program Plan, are not identified by SIC code and therefore are not addressed by this crosswalk methodology.

5.4.1 Potential New Categories Consisting of Both Direct and Indirect Dischargers

From its review of facilities with discharge data in TRI and/or PCS EPA identified several SIC codes for which it determined that the processes, operations, wastewaters, and pollutants were not similar to those of the existing categories, and therefore should be considered as part of potential new point source categories. These SIC codes, for which EPA has identified both direct and indirect dischargers, can be grouped into two categories: tobacco products, and miscellaneous foods and beverages.

5.4.1.1 Tobacco Products

Public comments on the preliminary 2004 Plan suggested that EPA consider developing effluent guidelines for the tobacco products industrial sector due to the potential of facilities in this industrial sector to discharge nontrivial amounts of nonconventional and toxic pollutants. In particular, commenters expressed concern over the quantity of toxics and carcinogens that may be discharged in wastewater associated with the manufacture of cigarettes. At the time of publication of the final 2004 Plan, EPA was unable to make a determination, based on readily available information, as to whether toxic and nonconventional discharges associated with tobacco products facilities are trivial or nontrivial. In order to better respond to these comments and determine whether to identify the tobacco products industrial sector as a potential new point source category, EPA is conducting a detailed study of the pollutant discharges for this industrial sector.

This industrial sector is divided into the following four industry groups:

- SIC code 2111 (Cigarettes) - establishments primarily engaged in manufacturing cigarettes from tobacco or other materials;

- SIC code 2121 (Cigars) - establishments primarily engaged in manufacturing cigars;

- SIC code 2131 (Chewing and Smoking Tobacco and Snuff) - establishments primarily engaged in manufacturing chewing and smoking tobacco and snuff; and

- SIC code 2141 (Tobacco Stemming and Redrying) - establishments primarily engaged in the stemming and redrying of tobacco or in manufacturing reconstituted tobacco.

Based on information in the 2002 Economic Census, EPA estimates there are 114 tobacco products facilities in the United States, nine of which are direct dischargers and currently have NPDES permits. EPA's review of TRI and PCS data indicates that there is very little information about the facilities in this sector. Consequently, EPA is conducting a detailed review of this industrial sector. EPA plans to complete this detailed review prior to publication of the final 2006 Plan in order to determine whether to identify this industry sector as a potential new industrial point source category. Key issues EPA will address in its detailed study include the source and magnitude of the toxic and non-conventional pollutants discharged directly to waters of the U.S. and whether indirect discharges of these pollutants present any pass through or interference issues for POTW operations.

EPA has already made considerable progress in investigating pollutant discharges in this category [3]. EPA solicited and received assistance from the companies who represent 90% of the U.S. market. EPA held several meetings with these tobacco products companies since publication of the 2004 Plan and the meeting minutes are included in the docket. [4, 5] These companies have provided extensive information on processes, pollutant discharges and existing permits. Based on information collected to date, EPA believes that primary processing at cigarette manufacturers and their related reconstituted tobacco operations is the main source of discharged wastewater pollution in this industrial sector. EPA conducted site visits at six tobacco product facilities, four cigarette manufacturing facilities and two dedicated reconstituted tobacco facilities. In addition to collecting information on processes and wastewater generation, EPA also collected grab samples of wastewater during these site visits. EPA collected these wastewater samples to: (1) further characterize wastewater generated and/or discharged at these facilities; and (2) evaluate treatment effectiveness, as applicable. EPA expects to place non-CBI information and data regarding these site visits and sampling episodes in the public record (EPA Docket No. OW-2004-0032) by December 2005.

5.4.1.2 Miscellaneous Foods and Beverages

The 26 SIC codes EPA includes in the miscellaneous foods and beverages industry are listed in Table 5-4, along with a tabulation of the data available from TRI and PCS. EPA identified this industry as a point source category in the 1970s, but did not promulgate regulations for it [6].

During the development of its 2004 ELG Program Plan, based on comments and information received by stakeholders, EPA reviewed three of the SIC codes that are considered part of the miscellaneous foods and beverages industry. These three SIC codes are:

- 2085 - Distilled and blended liquors;
- 2082 - Malt beverages; and
- 2075 - Soybean oil mills.

As a result of the 2004 review, EPA concluded (at that time) that the processes, operations, wastewaters, and pollutants discharged by facilities in these three SIC codes are similar to those at fruits and vegetables processing plants and are appropriately considered potential new subcategories of 40 CFR Part 407 (Canned and Preserved Fruits and Vegetables Processing).

As discussed in Section 5.2 and 5.3, during the 2005 annual review, EPA reviewed industries with SIC Codes not clearly subject to existing ELGs. During this review, EPA noted that discharges from 26 SIC codes did not meet the applicability requirements of any existing effluent guideline. These 26 SIC codes are related to the manufacture of a variety of food products such as: frozen foods, coffee, wines and spirits, sodas, candy, cookies and crackers, nuts, vegetable oils, macaroni, and bread. EPA has now concluded that these 26 SIC codes, including SIC code 2085 (distilled and blended liquors), SIC code 2082 (malt beverages), and SIC code 2075(soybean oil mills), should be reviewed as a group, because of the similarity of their operations and wastewater characteristics. However, at this time, EPA is unable to make a determination, based on readily available information, as to whether toxic and nonconventional discharges associated with the miscellaneous foods and beverages industry are trivial or nontrivial. EPA plans to study this industry during the next review cycle and collect additional information to determine whether to identify this industry as a potential new point source category in a future Plan.

Table 5-4. SIC Codes Comprising the Miscellaneous Foods and Beverages Category

		TRI				PCS		
SIC Code	SIC Description	Number of Direct Dischargers	Number of Indirect Dischargers	Number of Facilities that Discharge Both Direct and Indirect	TWPE	Number of Majors	Number of Minors	TWPE
2032	Canned Specialties	0	6	1	5.1	0	7	-
2034	Dehydrated Fruits, Veg, Soups	0	2	0	1.8	0	2	-
2038	Frozen Specialties, Nec	2	10	1	13,326	0	4	-
2051	Bread & Other Bakery Products	0	1	0	0.007	0	3	-
2052	Cookies and Crackers	0	1	0	0.3	0	3	-
2053	Frozen Bakery Products	0	3	0	6.8	0	1	-
2064	Candy & Other Confection Prod	0	4	0	2.6	0	1	-
2066	Chocolate and Cocoa Products	0	2	0	2.0	0	3	-
2067	Chewing Gum	0	0	0	-	1	1	-
2068	Salted & Roasted Nuts & Seeds	0	0	0	-	0	1	-
2074	Cottonseed Oil Mills	0	5	0	0.13	0	2	-
2075	Soybean Oil Mills	4	35	3	5,887	1	14	-
2076	Veg. Oil Mills, Except Corn	0	5	0	0.03	1	1	-
2079	Short, Table Oils, Margarine	0	8	1	544	0	3	-
2082	Malt Beverages	4	12	1	30,145	3	7	9,784
2083	Malt	1	0	0	1.5	0	1	-
2084	Wines, Brandy & Brandy Spirit	0	2	0	62	0	3	-
2085	Dist, Rectified & Blended Liq	1	1	0	60	7	21	324,924
2086	Bot & Can Soft Drnk & Carb wa	0	6	0	46	0	7	-
2087	Flav Extr & Flav Syrups, Nec	0	5	0	19	0	7	-
2095	Roasted Coffee	1	1	0	432	0	1	-

Table 5-4 (Continued)

SIC Code	SIC Description	TRI				PCS		
		Number of Direct Dischargers	Number of Indirect Dischargers	Number of Facilities that Discharge Both Direct and Indirect	TWPE	Number of Majors	Number of Minors	TWPE
2097	Manufactured Ice	0	1	0	3.2	0	2	-
2098	Macaroni, Spagh, Vermi, Noodl	0	0	0	-	0	3	-
2099	Food Preparations, Nec	1	19	3	1,488	0	9	-
5144	Poultry and Poultry Products	0	1	0	-	0	1	-
5182	Wine & Dist Alcoholic Beverage	0	0	0	-	0	2	-

5.4.2 Potential New Categories of Indirect Dischargers

Based on industries identified by stakeholder comments and pollutant discharge information, EPA reviewed the discharges from seven industrial sectors that are composed entirely or nearly entirely of indirect dischargers. These sectors are:

- Food Service Establishments;
- Industrial Laundries;
- Photoprocessing;
- Printing and Publishing;
- Independent and Stand Alone Laboratories;
- Industrial Container and Drum Cleaning; and
- Health Services Industries (including Hospitals, Veterinary Care Services, Dental Offices, and Medical Laboratories).

The SIC Codes EPA associated with these industries are listed in Table 5-5, along with a tabulation of the data available from TRI and PCS. As required by Section 307(b) of the Clean Water Act, EPA promulgates categorical pretreatment standards for an industry only if its wastewater discharges pass through or interfere with the operation of their POTW. EPA analyzed the potential for toxic pollutants and nonconventional pollutants discharged from these industries to pass through the receiving POTW or interfere with the operations of the receiving POTW. EPA's evaluation of pass through for each of these industries varied depending on available data. For most industries, EPA did not calculate the actual amount of pass through.[1] Instead, EPA looked at one or more of the following: potential pass through based on the total annual TWPE per facility; potential pass through at national level based on total annual TWPE for all indirect dischargers in an industrial category; and/or potential pass through for subsets of facilities that may drive or elevate the TWPE for the industrial category. To determine the potential for interference, EPA evaluated anecdotal and qualitative information. Where EPA determined there was a potential for pass through/interference from an industry's discharges, then EPA further considered whether categorical pretreatment standards may be appropriate to address the potential pass through/interference, based on factors such as hazard, cost effectiveness, and the availability of other regulatory and non-regulatory tools to address the issue.

[1]Generally in the effluent guidelines program, EPA determines whether or not a pollutant passes through a POTW by comparing the median percentage of the pollutant removed by POTWs operating secondary treatment with the median percentage removed by facilities operating the treatment technology that serves as the basis for the discharge requirements. If the percentage removed by the POTW is less than that of the treatment technology basis, then EPA deems the pollutant to pass through. While this is EPA's general approach, EPA notes that it has developed other means for determining pass through for some industries. For example, EPA used an alternate pass through methodology for phenol in its OCPSF rulemaking (Pages III-6 and 7, and Appendix III-A, May 1993 Supplement to OCPSF Development Document (EPA 821-R-93-007) and for ammonia in its 2002 Iron and Steel rulemaking (Page 12-12 in the Iron and Steel Development Document (EPA 821-R-02-004).

Table 5-5. Potential New Categories of Indirect Dischargers

Point Source Category	SIC Code	SIC Description	Census 2002 Establishments	PCS		TRI			
				Number of Majors	Number of Minors	Number of Direct Dischargers	Number of Indirect Dischargers	Number of Facilities that Discharge Both Direct and Indirect	Number of Facilities Reporting Surface Water Discharges
Food Service Establishments	5812	Eating Places	460,435		58				
Industrial Laundries	7218	Industrial Launderers	1,488		2				
Photo Processing	7221	Photographic Studios, Portrait							
Photo Processing	7335	Commercial Photography							
Photo Processing	7336	Comm Art & Graphic Design							
Photo Processing	7384	Photofinishing Laboratories	4,723	1					
Printing & Publishing	2711	Newspapers: Publishing & Print	10,634		1	0	1	0	1
Printing & Publishing	2721	Periodicals: Publishing & Prin	9,206		1				
Printing & Publishing	2731	Books: Publishing & Printing	6,282		1				
Printing & Publishing	2732	Book Printing	596		2	0	5	0	5
Printing & Publishing	2741	Miscellaneous Publishing							
Printing & Publishing	2752	Commercial Print, Lithographic	23,300		3	0	25	0	25
Printing & Publishing	2754	Commercial Printing, Gravure	360	1	2	1	16	1	18
Printing & Publishing	2759	Commercial Printing, Nec	16,574		3	1	6	0	7
Printing & Publishing	2761	Manifold Business Forms	770		1				
Printing & Publishing	2771	Greeting Card Publishing	25,892		1	0	2	0	2
Printing & Publishing	2782	Blankbooks,looseleaf Binders	1,010			0	1	0	1
Printing & Publishing	2789	Bookbinding & Related Work	1,236	1					
Printing & Publishing	2791	Typesetting							

Table 5-5 (Continued)

Point Source Category	SIC Code	SIC Description	Census 2002 Establishments	PCS		TRI			
				Number of Majors	Number of Minors	Number of Direct Dischargers	Number of Indirect Dischargers	Number of Facilities that Discharge Both Direct and Indirect	Number of Facilities Reporting Surface Water Discharges
Independent and Stand Alone Labs	8731	Commercial Physical Research	26,066	4	27	2	0	0	2
Independent and Stand Alone Labs	8734	Commercial Testing Laboratory	31,601	3	5	0	1	0	1
Industrial Container Drum Cleaning	Not Defined by Sic Code								
Health Services Industries	0741	Vet Services for Livestock	25,653		1				
Health Services Industries	0742	Vet Serv for Animal Specialty	25,653		2				
Health Services Industries	8011	Offices & Clinics of Med Doct	210,588		4				
Health Services Industries	8021	Outpatient Care Facilities							
Health Services Industries	8031	Offices/clincs of Doc of Osteo							
Health Services Industries	8041	Offices & Clinics of Chiroprac							
Health Services Industries	8042	Offices & Clinics of Optometri							
Health Services Industries	8043	Offices & Clinics of Podiatris							
Health Services Industries	8049	Offices of Health Practitioner							
Health Services Industries	8051	Skilled Nursing Care Facilitie	85,486		26				
Health Services Industries	8052	Intermediate Care Facilities	85,486		19				
Health Services Industries	8059	Nursing and Personal Care, Nec	85,486		22				
Health Services Industries	8062	Gen. Medical/surgical Hospital	10,808	1	20				
Health Services Industries	8063	Psychiatric Hospitals	1,210	1	7	1	0	0	1

Table 5-5 (Continued)

Point Source Category	SIC Code	SIC Description	Census 2002 Establishments	PCS		TRI			
				Number of Majors	Number of Minors	Number of Direct Dischargers	Number of Indirect Dischargers	Number of Facilities that Discharge Both Direct and Indirect	Number of Facilities Reporting Surface Water Discharges
Health Services Industries	8069	Specialty Hospitals	13,082		2				
Health Services Industries	8071	Medical Laboratories	11,090		2				
Health Services Industries	8072	Dental Laboratories							
Health Services Industries	8082	Home Health Care Services	35,332		1				
Health Services Industries	8092	Kidney Dialysis Centers	6,270		1				
Health Services Industries	8093	Speciality Outpatient Clinics							
Health Services Industries	8099	Health & Allied Services, Nec	33,697		3				

Sources: U.S. Economic Census, *PCSLoads2002_v02*, *TRIReleases2002_v02*.

EPA's review and analysis of each of these industries is described in DCNs 02101, 02102, 02103, 02263, 02293, 02294, and 02295. Data sources for these reviews include TRI, PCS[1], EPA reports and studies, periodicals and textbooks, EPA pretreatment coordinators and permitting authorities, and industry supplied information. The following sections summarize EPA's evaluation of potential new categories of indirect dischargers under CWA sections 304(g) and 307(b).

5.4.2.1 Food Service Establishments

According to the Economic Census, in 1997 there were approximately 470,000 food service establishments in the U.S. None of these facilities report to TRI. Based on available information from PCS, these facilities discharge far less than 1 TWPE per facility per year. [7] As a result, the data indicate that minimal quantities of toxic pollutants pass through receiving POTWs.

According to EPA Regional pretreatment coordinators [8, 9] and Internet queries [10, 11], the pollutant, "fats, oil, and grease" (FOG) is the predominant pollutant of concern from food service establishments. Wastewater discharges of FOG may clog sewers and thus interference with POTW performance. FOG discharges from food service establishments have been linked to sewer blockages which have been tied to a large percentage of storm sewer overflows (SSOs). FOG is effectively controlled by installing grease traps at the discharging facility. [7]

Historically, EPA has not established categorical pretreatment standards for conventional pollutants (FOG is a component of oil and grease) unless they serve as an indicator parameter for toxic pollutants. EPA Regional pretreatment coordinators report that a growing number of POTWs are using existing authority (under Part 403 general pretreatment standards)

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[1]Even though PCS only contains information for direct dischargers, this information can be useful in gaining some understanding of the types of discharges from a particular industry

to tighten-up on permit limits or to enforce existing permit limits to reduce blockages from FOG. [8, 9]

Based on the available information, EPA concludes that pass through potential of toxic and non-conventional pollutants from food service establishments represents a low hazard per facility. In addition, interference from conventional-type pollutants can be adequately addressed by Part 403 requirements and enforcement. For these reasons, EPA concluded that development of categorical pretreatment standards for food service establishments is not warranted at this time.

5.4.2.2 Industrial Laundries

According to the Economic Census, in 2002 there were approximately 2,679 industrial laundries in the U.S. EPA proposed but did not promulgate, pretreatment standards for this industry. In 1999, EPA withdrew its proposed pretreatment standards for this industry. See 64 Fed. Reg. 45,071 (Aug. 18, 1999). EPA determined that indirect discharges from industrial laundries did not warrant national regulation because of the small amount of pollutants removed by the pretreatment options that were found to be economically achievable. At that time, EPA estimated the total annual TWPE for industrial laundries to be 88,000 and that the amount of pollution that would be removed through pretreatment standards would be less than 32 TWPE per facility annually. In addition, EPA found that POTWs were generally not experiencing problems with discharges from this industry, and that such discharges were unlikely to present a problem at the national level. To the extent that isolated problem discharges occurred, existing pretreatment authority was available to control these isolated discharges. EPA concluded that for this industry, the best way to control effluent discharges of certain organic pollutants is to remove the pollutants that are contained on the laundry items before they are washed. [12]

In addition, at the time of EPA's final decision, representatives from this industry agreed to a voluntary pollutant reduction program. The industry refers to this program as the Laundry Environmental Stewardship Program or LaundryESP®. [13] The industry designed this program to encourage improvement in four areas:

- Water usage;
- Energy usage;
- Wash chemical usage; and
- Pollutant discharges.

The Uniform and Textile Service Association (UTSA) and Textile Rental Service Association (TRSA) evaluated the performance of the LaundryESP® in 2004 and found that a large percentage of the industry has implemented this program and that as a whole it has been successful in reducing water usage, energy usage, wash chemical usage, and pollutant discharges. [13]

As evidenced by the industry's 2004 evaluation of the LaundryESP® program, EPA concludes that pollutant discharges from industrial laundries have not increased since the time of its 1999 decision not to regulate these discharges. [13] Therefore, pass through potential from industrial laundries continues to represent low hazard per facility and development of categorical pretreatment standards for industrial laundries continues to be unwarranted at this time.

5.4.2.3 Photoprocessing

According to the Economic Census, in 1997 there were approximately 40,000 photoprocessing facilities in the U.S., including 7,100 photofinishing laboratories. By 2002, the number of photofinishing laboratories decreased to 4,700.

In 1976, EPA promulgated a final rule establishing BPT for the Photographic Category (Part 459). At that time, EPA also noticed its intent to establish PSNS for this industrial category in 1976, but did not do so. In 1997 published EPA a Preliminary Data Study for the Photoprocessing Industry. [14] That study noted that the vast majority of photoprocessing facilities are small (less than 10 employees), typically discharge less than 1,000 gallons/day of wastewater, and overwhelmingly discharge to POTWs. The study also noted that discharge permits for photoprocessing facilities are currently based on local limits (established by POTWs to ensure the POTW meets its permitted discharge limits). These local limits generally consist of numeric concentration-based limits for silver only.

Pollutant loading estimates based on most recent information available indicate annual TWPE discharges for the industry are approximately 300,000 (over 99% due to silver). On a per facility basis, this equates to discharges of less than 10 TWPE per year. [14]

Moreover, the silver discharged to POTWs is unlikely to pass through, as many POTWs have stringent silver limits in their NPDES permits or are required to reduce metals concentrations in biosolids. To reduce the amount of silver discharged to POTWS, the Association of Metropolitan Sewerage Agencies (AMSA) and its successor organization, National Association of Clean Water Agencies, along with the Silver Council and two industry groups for the photographic industry developed a "Code of Management Practices for Silver Dischargers." [15] Four POTWs documented loadings reductions of 20% to 52% over historical baselines after CMP implementation.

In addition, literature searches indicate the photoprocessing industry is rapidly moving towards digital technology (the ultimate in pollution prevention because it eliminates the need for silver). [16, 17, 18]

Based on the available information, EPA concludes that pass through potential of toxic and non-conventional pollutants from photoprocessing establishments represents a low hazard per facility and concludes that development of categorical pretreatment standards for photoprocessing establishments is not warranted at this time.

5.4.2.4 Printing and Publishing

According to the Economic Census, in 1997 there were approximately 48,000 printing and publishing facilities in the U.S.

EPA published a study of this industry in October 1983. [19] EPA concluded that national pretreatment standards were not warranted due to the small quantity of toxic pollutant discharges associated with this industry 0.0021 to 0.914 pounds per day per facility.

Based on more recent available information from TRI and PCS, these facilities continue to discharge small quantities of toxic pollutants. These more recent data also indicate that wastewater discharge volumes may have decreased from those presented in the 1983 Data Summary. Based on 2002 data from TRI and PCS, these facilities discharged far less than 1 TWPE per facility per year. Of these discharges, copper contributes over 90% of the total TWPE. Copper discharges are associated with the gravure printing process. [20, 21, 22] Annual discharges from gravure printing are approximately 44 TWPE per facility.

Based on the available information, EPA concludes that pass through potential of toxic and non-conventional pollutants from printing and publishing establishments represents a low hazard per facility and concludes that development of categorical pretreatment standards for printing and publishing establishments is not warranted at this time.

5.4.2.5 Independent and Standalone Laboratories

Independent and Stand Alone Laboratories are establishments classified under SIC Codes 8731 and 8734. Typical operations vary widely and include research or testing in the chemical, natural resources, energy, manufacturing, environmental, material science, industrial hygiene, food, and engineering sectors. Lab operations differ from other industries in that labs typically use low quantities of a wide variety of substances. Operations are also highly variable. As a result, labs typically generate a small quantity of a large variety of pollutants and include: metals (e.g., copper, lead, silver, and zinc), solvents (e.g., benzene, toluene), and nutrients (e.g., nitrogen). Preliminary information indicates that nearly all independent and stand alone laboratories discharge indirectly to POTWs. [23]

EPA has little readily available information to characterize wastewater discharges from independent and stand alone laboratories. As a result, EPA has concluded that it does not have readily available information to make an informed determination as to whether toxic and non-conventional discharges associated with independent and stand alone laboratories pass through or interfere with POTWs. For this reason, EPA plans to study this industry further during the 2007-2008 review cycle.

5.4.2.6 Industrial Container Drum Cleaning (ICDC)

The Industrial Container and Drum Cleaning (ICDC) industry includes facilities that clean and recondition metal and plastic drums and intermediate bulk containers for resale, reuse, or disposal. In 2002, EPA collected data and compiled a Preliminary Data Summary for Industrial Container Drum Cleaning Facilities (PDS). [24] The PDS identified approximately 291 ICDC facilities, all of which discharge indirectly to a Publicly Owned Treatment Works (POTW). The ICDC industry was originally considered as part of the Transportation Equipment Industry (TEC, 40 CFR 442). Because of significant differences, however, this portion of the industry was not included in the scope of 40 CFR Part 442.

The 2002 Study remains EPA's main source of data for this industry. Neither PCS nor TRI contains any information on discharges from this industry. ICDC facilities are classified into three categories: drum washing; drum burning; and intermediate bulk container (IBC) cleaning/reconditioning. [24] Drum washing and burning facilities generally have raw wastewater characteristics comparable or more concentrated than the TEC industry. Pollutant concentrations in IBC cleaning were generally less concentrated than the TEC industry. However, dioxin was detected in IBC raw wastewaters. Raw, untreated wastewater pollutant loadings for the ICDC industry vary depending on the container type being cleaned and ranged from 46,000 TWPE to 42,000,000 per facility. The Study also identified various pollution prevention opportunities and treatment options. Possible PSES technology bases are equalization and DAF, equalization and chemical precipitation/clarification; or a combination. [24] EPA is conducting a pass through analysis for this industry and expects to include the final results in the notice and docket accompanying the final 2006 Effluent Guidelines Plan.

5.4.2.7 Health Services Industries

Health Services Industries include establishments engaged in various aspect of human health (e.g. hospitals, dentists, medical/dental laboratories) and animal health (e.g. veterinarians). These establishments fall under SIC Major Group 80 Health Services and Industry Group 074 Veterinary Services. According to the 2002 Census, there are over 500,000 facilities in the health services industries. The vast majority of establishments in the health services industries are not subject to categorical limitations and standards. In 1976, EPA promulgated 40 CFR Part 460 which only applies to effluent discharges to surface water from hospitals with greater than 1,000 occupied beds. [25]

In evaluating the health services industries, EPA found little readily available information. Both PCS and TRI contain sparse information on health care service establishments. In 1989, EPA published a Preliminary Data Summary (PDS) for the Hospitals Point Source Category. [26] Also, EPA's Office of Enforcement and Compliance Assistance (OECA) published a Healthcare Sector Notebook in 2005. [27] In addition, for some portions of this industry such as dentists, industry and POTWs have conducted studies to estimate discharges.

Based on preliminary information, nearly all health services establishments discharge indirectly to POTWs. The major source of concern for discharges from health care service establishments include mercury, silver, endocrine disrupting chemicals (EDCs), pharmaceuticals, and biohazards. [28, 29, 30] While EPA has some information on mercury and silver discharges, EPA has little to no information on wastewater discharges of emerging pollutant concerns such as EDCs and pharmaceuticals.

EPA has concluded that it does not have readily available information to make an informed determination as to whether toxic and non-conventional discharges associated with health services industries pass through or interfere with POTWs. For this reason, EPA plans to study this industry further during the 2007-2008 review cycle.

5.5 Category Not Identifiable

As EPA developed the crosswalk between SIC codes and existing point source categories described in Sections 5.2 and 5.3, it reviewed information about facilities with discharge data in TRI and/or PCS that have SIC Codes and are not clearly subject to existing ELGs. As discussed in Sections 5.3 and 5.4, EPA identified several SIC codes that may comprise potential new subcategories of existing point source categories or potential new point source categories.

In addition, EPA identified a number of SIC codes for which it determined that the processes, operations, wastewaters, and pollutants of the facilities with discharge data in TRI and/or PCS were not similar to each other and thus that the SIC code with which they were identified could not be used to define a point source category for the development of ELGs.

One example is SIC Code 9711, National Security. The facilities in this SIC code that reported discharges to TRI and PCS include Army, Navy, Air Force, and Marine Corps bases and Department of Energy facilities. During the development of the 2004 ELG Program Plan, EPA concluded that facilities reporting SIC Code 9711 are subject to existing ELGs based on the operations carried out at each facility. Based on the diversity of these operations and the fact that they are being regulated under existing ELGs, EPA does not believe that national security facilities constitute a coherent new industrial category, but rather include a range of processes operated at government facilities.

For other SIC codes, EPA has data from PCS or TRI for only one or two facilities reporting these SIC codes, and the operations from which wastewater are released are not related to the activity described by the SIC code (e.g., SIC 3991, Brooms and Brushes, SIC Code 3952, Lead Pencils and Art Goods). Because of the uncertainty about these discharges and with limited information, EPA could not identify coherent groupings of these SIC codes at this time. EPA solicits public comment on whether there are any coherent groupings of SIC codes that might be considered potential new point source categories.

The SIC codes identified with facilities with discharge data in TRI and/or PCS for which EPA could not identify a point source category are listed in Table 5-6, along with a tabulation of the data available from TRI and PCS.

Table 5-6. SIC Codes of Facilities with Discharge Data in TRI and/or PCS that EPA Identified as "Not a Category"

SIC Code[1]	SIC Description	TRI		PCS	
		Number of Facilities Reporting Surface Water Discharges	TWPE	Number of Majors	TWPE
3952	Lead Pencils and Art Goods	1	0.02	0	-
3955	Carbon Paper and Inked Ribbons	1	0.03	0	-
3991	Brooms and Brushes	0	-	0	-
4213	Trucking, Except Local	0	-	3	5.8
4226	Special Warehousing & Storage	0	-	3	1,452
4789	Transportation Services, Nec	0	-	1	27
4932	Gas & Other Services Combined	0	-	0	-
5091	Sporting & Recreational Goods	0	-	0	-
5093	Scrap & Waste Materials	1	0.10	0	-
6512	Oper of Nonresidential Bldgs	1	5.4	2	9.0
6552	Land Subdividers & Dev, ex Cem	0	-	5	46
7389	Business Services, Nec	5	22	0	-
8221	Colleges, Univ & Prof Schools	0	-	1	738
8299	Schools & Educational Services	0	-	2	5,398
8731	Commercial Physical Research	2	128	4	602
8733	Noncommercial Research Organi	4	34	1	44
8734	Commercial Testing Laboratory	1	0.02	3	10
8744	Facilities Support Services	2	2.6	0	-
8999	Services, Nec	1	964	0	-
9111	Executive Offices	0	-	1	411
9199	General Government, Nec	1	2,500	1	231
9223	Correctional Institutions	0	-	8	5,944
9511	Air & Water Res & Sol Wste Mgt	3	8,220	6	336

Table 5-6 (Continued)

SIC Code[1]	SIC Description	TRI		PCS	
		Number of Facilities Reporting Surface Water Discharges	TWPE	Number of Majors	TWPE
9512	Land, Min, Wildlife/forest Con	1	672	1	798
9611	Admin of General Economic Pro	0	-	1	6,841
9711	National Security	41	11,546	33	108,340

[1]Only SIC codes of facilities with wastewater discharge data in TRI and/or PCS are listed in this table.

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6.0 QUALITY REVIEW

EPA's screening-level analysis involves the collection and use of existing environmental data for purposes other than those for which they were originally collected. PCS was designed to automate entry, updating, and retrieval of National Pollutant Discharge Elimination System (NPDES) data and track permit issuance, permit limits and monitoring data, and other data pertaining to facilities regulated under NPDES. The primary purpose of the TRI is to collect annual data on releases and transfers of certain toxic chemicals from industrial facilities and make the data public to inform communities and citizens of chemical hazards in their areas. Sections 2.0 and 3.0 of this report describe how EPA used the data in PCS and TRI to calculate annual pollutant loadings and prioritize industrial category discharges for further review. This section describes the quality review steps that EPA uses to determine if the TRI and PCS data are suitable for EPA's use in a screening-level analysis. The remainder of this section is divided into the following subsections:

- Section 6.1 - Overview of Quality Review Steps;
- Section 6.2 - Summary of *PCSLoads2002* Quality Review; and
- Section 6.3 - Summary of *TRIReleases2002* Quality Review.

6.1 Overview of Quality Review Steps

EPA considers the following factors in its quality review of the PCS and TRI data:

- *Completeness*. The following information is needed to analyze the toxic weighted pollutant loadings discharged by industrial categories:

  - Facility identity,
  - Industrial category under which the facility is regulated,
  - Identity of parameters discharged and corresponding toxic weighting factors (TWFs),
  - Mass of pollutants discharged (or pollutant concentration and discharge flow, from which the mass can be calculated), and

    - Understanding of how available information represents the discharger population and pollutant population.

- *Accuracy*. Analyzed data should accurately categorize and aggregate the underlying database.

- *Reasonableness*. Pollutant identities must be reasonably related to the operations in the category. Reported or calculated loads and facility wastewater flows should reflect the range of flows and loads known to exist in the United States.

The following subsections discuss each of these factors in more detail.

6.1.1 Completeness Checks

EPA compares the number of facilities listed in the 1997 and 2002 U.S. Economic Census to the number of facilities reporting to PCS and TRI to determine the extent to which the facilities reporting to PCS and TRI represent the entire industry. For each SIC code, EPA compares the total number of facilities for the SIC code as enumerated by the 1997 and 2002 U.S. Economic Censuses, the total number of facilities reporting to TRI, the number of facilities reporting wastewater discharges (direct or indirect) in TRI, and the number of major and minor facilities reporting to PCS.

EPA also considers the pollutant discharges that do not contribute to the category rankings. For TRI-reported releases, EPA determines how many of the 612 chemicals and chemical categories have TWFs. EPA identifies chemicals for which it has not developed a TWF and calculates the total pounds released. For PCS, EPA identifies and profiles the pollutant parameters that do not have an assigned TWF.

The 2002 U.S. Economic Census counted facilities in 644 SIC codes. For each of these 644 SIC codes, EPA determined the percentage of the establishments counted by the census that are represented in TRI and PCS. Tables 6-1 and 6-2 show the distribution of the 644 SIC codes by their representation in the TRI and PCS databases, respectively.

For example, as shown in Table 6-1, for 39 SIC codes the number of facilities reporting wastewater discharges to TRI was at least 10 percent, but less than 25 percent, of the number of facilities counted by the census. Similarly, as shown in Table 6-2, the number of major dischargers in PCS was more than 25 percent of the number of facilities counted by the census for 11 SIC codes.

Table 6-1. Distribution of SIC Codes by Representation in TRI

	Number of SIC Codes
No facilities reporting to TRI	180
No facilities reporting wastewater discharges to TRI, but at least one facility reporting any medium	64
At least one facility reporting wastewater discharges to TRI, but less than 10% of the number of establishments enumerated by the 2002 economic census report wastewater discharges to TRI	336
Between 10 and 25% of the number of establishments enumerated by the 2002 Economic Census report wastewater discharges to TRI	39
More than 25% of the number of establishments enumerated by the 2002 Economic Census report wastewater discharges to TRI	25

Source: *TRIReleases2002_v02*; 2002 U.S. Economic Census.

Table 6-2. Distribution of SIC Codes by Representation in PCS

	Number of SIC Codes
No facilities included in PCS	45
No facilities classified as major dischargers included in PCS, but at least one minor discharger	375
At least one facility classified as a major discharger included in PCS, but less than 10% of the number of establishments enumerated by the 2002 economic census are classified as major dischargers in PCS	201
Between 10 and 25% of the number of establishments enumerated by the 2002 Economic Census are classified as major dischargers in PCS	12
More than 25% of the number of establishments enumerated by the 2002 Economic Census report are classified as major dischargers in PCS	11

Source: *PCSLoads2002_v02*; 2002 U.S. Economic Census.

Tables 6-3 and 6-4 list the SIC codes for which a relatively high percentage of the 2002 Census count had data in TRI and PCS. Because facilities are not required to use the same SIC codes for environmental reporting as are used for the census, for two SIC codes (phosphate rock and lead and zinc ores) the number of major dischargers in PCS was more than 100 percent of the number of facilities counted by the census.

Table 6-3. SIC Codes Well-Represented in TRI

SIC Code	SIC Description	Census 2002 Number of Establishments	Number of TRI Water Dischargers	Percent of Census Establishments Represented by TRI	Rank
2911	Petroleum Refining	199	133	66.83	1
1031	Lead and Zinc Ores	22	11	50.00	2
2063	Beet Sugar	35	17	48.57	3
2111	Cigarettes	15	7	46.67	4
3691	Storage Batteries	130	58	44.62	5
2021	Creamery Butter	35	15	42.86	6
2874	Phosphatic Fertilizers	44	18	40.91	7
2631	Paperboard Mills	199	78	39.20	8
3633	Household Laundry Equipment	18	7	38.89	9
2823	Cellulosic Man-made Fibers	8	3	37.50	10
3351	Roll/draw/extruding of Copper	136	51	37.50	11
2812	Alkalies and Chlorine	40	14	35.00	12
2621	Paper Mills	329	110	33.43	13
3313	Electrometallurgical Products	24	8	33.33	14
2865	Cyclic Crudes Interm., Dyes	217	72	33.18	15
2895	Carbon Black	25	8	32.00	16
3334	Primary Production of Aluminum	41	13	31.71	17
3011	Tires and Inner Tubes	158	50	31.65	18
2821	Plstc Mat./syn Resins/nv Elast	688	202	29.36	19
2296	Tire Cord and Fabric	28	8	28.57	20
3331	Primry Smelting & Copper Refin	15	4	26.67	21
2816	Inorganic Pigments	105	28	26.67	22
2873	Nitrogen Fertilizers	143	38	26.57	23
3632	Household Refrig. & Freezers	23	6	26.09	24
2861	Gum and Wood Chemicals	52	13	25.00	25

Source: *TRIReleases2002_v02*; 2002 U.S. Economic Census.

Table 6-4. SIC Codes Well-Represented in PCS

SIC	SIC Description	Census 2002 Number of Establishments	Number of PCS Major Dischargers	Percent of Census Establishments Represented by PCS	Rank
1475	Phosphate Rock	15	17	113.33	1
1031	Lead and Zinc Ores	22	23	104.55	2
3334	Primary Production of Aluminum	41	23	56.10	3
2911	Petroleum Refining	199	107	53.77	4
2063	Beet Sugar	35	17	48.57	5
1094	Uranium-radium-vanadium Ores	17	8	47.06	6
2812	Alkalies and Chlorine	40	15	37.50	7
2823	Cellulosic Man-made Fibers	8	3	37.50	8
2621	Paper Mills	329	123	37.39	9
1021	Copper Ores	33	12	36.36	10
2874	Phosphatic Fertilizers	44	14	31.82	11
2631	Paperboard Mills	199	43	21.61	12
2062	Cane Sugar Refining	20	4	20.00	13
3331	Primry Smelting & Copper Refin	15	3	20.00	14
1044	Silver Ores	11	2	18.18	15
1011	Iron Ores	24	4	16.67	16
2611	Pulp Mills	560	87	15.54	17
2873	Nitrogen Fertilizers	143	22	15.38	18
2816	Inorganic Pigments	105	14	13.33	19
2821	Plstc Mat./syn Resins/nv Elast	688	90	13.08	20
3312	Blast Furn/steel Works/rolling	593	75	12.65	21
3313	Electrometallurgical Products	24	3	12.50	22
2865	Cyclic Crudes Interm., Dyes	217	24	11.06	23

Source: *PCSLoads2002_v02*; 2002 U.S. Economic Census.

6.1.2 Database Queries

EPA routinely verifies the accuracy of database queries used to analyze PCS and TRI data and generate output tables. As one team member creates queries, a second team member reviews the logic of the programming code, and compares the number of records in the output table to the number of records in intermediate queries. This ensures that no data are missing and that there are no duplicate records. EPA documents the quality checks in a database table that describes the function of each query created, the quality checks that were performed, the name of the reviewer, the date the query was reviewed, and any errors that were identified. Attachment 6 presents the quality check tables for the *TRIReleases2002* and *PCSLoads2002* databases.

6.1.3 Reasonableness Checks

EPA ranks pollutant discharges and facilities by toxic weighted loadings to identify discharges and loadings that are unusually high. EPA then conducts reasonableness checks on the unusually high pollutant discharges and facility loads to determine if the unusual values were misreported or miscalculated. The reasonableness checks are described in the following subsections.

6.1.3.1 Pollutant Identity

EPA ranks the pollutants discharged from each point source category and, using engineering understanding of industrial processes, verifies that the pollutants comprising the majority of the load could be reasonably related to operations in the industry. When it finds unexpected results, EPA compares the reported releases to information in the facility's NPDES permit and other available resources, such as facility descriptions and discussion with the facility contact. EPA corrects errors in PCS and TRI data and documents the corrections. For example, in the quality review of the *PCSLoads2002* database, EPA identified a pulp mill that reported discharges of elemental phosphorus, which was driving the facility's toxic weighted pound-equivalents (TWPE). EPA contacted the facility to verify this discharge since it did not seem reasonable for a pulp mill to discharge elemental phosphorus. The facility verified that the reported discharges were actually total phosphorus, as P.

6.1.3.2 Facility Loads

EPA reviews the toxic weighted loadings of facilities to ensure that they comprise a reasonable percentage of the total national discharge. Facilities that comprise a very high percentage of the national discharge have a large impact on the point source category rankings. EPA reviews NPDES permit data or other available data to identify where a facility may have made a calculation error or reported the incorrect units of measure, and contacts facilities to confirm suspected errors. EPA corrects confirmed errors and documents the corrections. For example, in the quality review of the *PCSLoads2002* database, EPA identified a facility whose calculated TWPE for dioxin was over a billion pound-equivalents. EPA reviewed the facility's NPDES permit limits and found that the facility was required to report dioxin in units of picograms per liter (pg/L), but the units in PCS were in milligrams per liter (mg/L). The units error caused EDS to overestimate the dioxin load by a factor of 1×10^9.

6.1.3.3 Calculated PCS Pollutant Loads

EPA reviews the EDS system output (i.e., the calculated kg/year for each pollutant at each discharge pipe) for pollutant discharges with the highest toxic weighted loads (e.g., dioxins and PCBs). To identify possible errors, EPA identifies any calculated discharges that are unreasonably high and compares them to PCS-reported concentrations and flows and TRI-reported releases. If the EDS output and TRI-reported releases are similar, EPA considers the EDS system output to be acceptable. For PCS data, EPA also identifies unrealistically high flow rates and seeks other available information (such as the NPDES permit fact sheet or a facility contact) to verify and/or correct the flow rates.

6.2 Quality Review of the *PCSLoads2002* Database

To identify potential anomalous loads, EPA ranked PCS facilities by total TWPE. EPA found that for facilities with high total TWPE, a large proportion of facility TWPE was based on estimated discharges for missing monthly data. EPA identified facilities with high TWPE for review. The PCS review included the following tasks:

- Comparison of 2002 PCS loads to 2000 PCS loads;
- Comparison of 2002 PCS loads to 2002 TRI releases;
- Review of reported discharge data and the estimated load for missing data;
- Review of permit limits;
- Review of NPDES permit or fact sheet where available; and
- Discussion with facility contact.

In addition, EPA contacted one facility whose loads were identified as unusual for their point source category. Table 6-5 presents EPA's PCS facility review and corrections made to the *PCSLoads2002* database.

6.3 Quality Review of the *TRIReleases2002* Database

EPA ranked TRI facilities by total TWPE released to surface waters to identify potential anomalous loads. For this analysis, EPA excluded facilities classified as Vinyl Chloride and Chlor-Alkali facilities, because reported discharges from these facilities will be scrutinized as part of the development of revised ELGs for these industries. After removing the Vinyl Chloride and Chlor-Alkali facilities, EPA identified 10 facilities with unusually high chemical releases for their point source category. To verify the wastewater releases, EPA contacted the 10 facilities and asked if the TRI data accurately reflected what they had reported. EPA also asked whether the reported release was based on sampling data and whether the pollutant was detected. Table 6-6 presents EPA's TRI facility review and any corrections made to the *TRIReleases2002* database.

Table 6-5. PCS Facility Review

Point Source Category	NPDES ID	Facility Name	City	Findings from Review	Recommended Loads Changes
Steam Electric Power Generation	AL0003140	AL Power Co.	Wilsonville	Facility confirmed that units on arsenic should be in µg/L.	Change units on arsenic from mg/L to µg/L.
Steam Electric Power Generation	CA0001368	Duke Energy South Bay	Chula Vista	Facility confirmed units on chlorine should be µg/L.	Change units on chlorine from mg/L to µg/L.
Water Supply	DC0000019	Washington Aqueduct - Dalecarlia	Washington, DC	The facility contact stated that the facility discharges for 24-hour periods intermittently throughout the year. PCS modeled discharges as continuous.	Recalculate load using 2002 dmr. Do not multiply load by 30 days/mo. Do not estimate for months with no reported discharges.
Steam Electric Power Generation	FL0002275	Gulf Power Co.	Pensacola	Facility confirmed that units on iron should be µg/L.	Change units on iron from mg/L to µg/L.
Steam Electric Power Generation	FL0002283	Gulf Power Co.	Chattahoochee	Facility confirmed that units on iron should be µg/L.	Change units on iron from mg/L to µg/L.
Pulp, Paper, and Paperboard	GA0002801	International Paper Co.	Augusta	2002 mercury discharges are inconsistent with other reporting years for PCS, as well as the 2002 releases reported to TRI. The facility contact said that the load in PCS did not match his DMR.	Mercury load was entered incorrectly. Change load to 0.021 lb/day.
Gum and Wood Chemicals	GA0003735	Hercules - Brunswick	Brunswick	Facility contact verified that the extremely high toxaphene discharges for 2002 are correct.	Make no changes to 2002 PCS data.
Steam Electric Power Generation	ME0000272	FPL Energy Wyman Station	Yarmouth	Facility confirmed units on mercury should be µg/L.	Change units on mercury from mg/L to µg/L.
Steam Electric Power Generation	NC000396	Progress Energy Asheville	Arden	Facility confirmed that units on copper should be µg/L.	Change units on copper from mg/L to µg/L.

Table 6-5 (Continued)

Point Source Category	NPDES ID	Facility Name	City	Findings from Review	Recommended Loads Changes
Textile Mills	NC0004618	Alamac Amer Knits	Lumberton	Review of monthly discharge data indicated that the chlorine load that is driving the TWPE is only reported for one month out of the year and estimated for 11 months. Facility contact said that they don't discharge chlorine at all, and the load must have been a data entry error.	Delete chlorine load for this facility.
Steam Electric Power Generation	NC0004979	Duke Energy Corp (Allen)	Belmont	Review of monthly data indicated an inconsistency in units for cadmium, zinc, and barium.	Change units on cadmium, zinc, and barium from mg/L to µg/L.
Steam Electric Power Generation	NC0004987	Duke Energy Corp (Marshall)	Terrell	Review of monthly data indicated an inconsistency in units for arsenic and selenium.	Change units on arsenic and selenium concentrations from mg/L to µg/L.
Pulp, Paper, and Paperboard	OR0000795	Fort James Operating Co.	Clatskanie	Review of NPDES permit limits indicated that TCDF is reported in units of pg/L. The unit code for TCDF in PCS, however, was mg/L.	Change units on TCDF concentrations from mg/L to pg/L.
Pulp, Paper, and Paperboard	OR0001074	Pope & Talbot Inc.	Halsey	Units are reported correctly in PCS. Measurements are lower than permit limit. No error identified.	Make no changes to 2002 PCS load.
Iron and Steel Manufacturing	PA0094510	US Steel Corp	Braddock	Pollutant discharges are high but nothing unreasonable was found.	Make no changes to 2002 PCS loads at this time.
Miscellaneous Foods and Beverages	PR0000591	Bacardi Corp	Catano	Review of permit limit and monthly data revealed an inconsistency in reporting units for sulfide. Facility contact said that the permit limit was changed from 240,000 µg/L to 2µg/L on 2/28/05. Bacardi is in compliance with the sulfide permit limits and is reporting in the correct units	Make no change to 2002 PCS load.

Table 6-5 (Continued)

Point Source Category	NPDES ID	Facility Name	City	Findings from Review	Recommended Loads Changes
Pulp, Paper, and Paperboard	SC0001015	Bowater Inc. - Coated Paper Division	Catawba	Dioxin discharges are reported to PCS in correct units. Manual calculation of load using monthly data verified PCS 2002 load. 2002 TRI data concur.	Make no change to 2002 PCS load.
Pulp, Paper, and Paperboard	TN0002356	Bowater Newsprint	Calhoun	Review of NPDES permit limits indicated that dioxin is reported in units of pg/L. Some PCS reports for dioxin are in pg/L while others reported as mg/L.	Change units on dioxin concentrations from mg/L to pg/L.
Pulp, Paper, and Paperboard	AL0000817	Meadwestvaco Coated Board	Cottonton	This is the only facility in the Pulp, Paper, and Paperboard Point Source Category that reports discharges of elemental phosphorus, which is driving the TWPE. Facility contact verified that facility tests for total phosphorus.	Change parameter code from elemental phosphorus (00442) to total phosphorus (PHOSP).
Nonferrous Metals Manufacturing	TN0029157	Pasminco Zinc, Inc.	Clarksville	Review of discharges by outfall description indicated that the high facility TWPE is due to stormwater discharges of cadmium.	Make no change to 2002 PCS data, however, make note that the discharges are from stormwater.
Nonferrous Metals Manufacturing	TX0003191	Encycle/Texas	Corpus Christi	Review of monthly reporting data showed that the load for cadmium was driven by an unusually high load reported for one month. The load for this month was inconsistent with the concentration and flow data provided for the same month.	Substitute high load with flow and concentration data. Change category to CWT.
Water Supply	TX0052639	San Antonio Water System	San Antonio	Review of monthly discharge data showed that the chlorine load was double counted using concentrations reported for 2 monitoring points on the same pipe.	Only use monitoring data from MLOC A (After disinfect) to calculate load.

Table 6-5 (Continued)

Point Source Category	NPDES ID	Facility Name	City	Findings from Review	Recommended Loads Changes
Water Supply	TX0052647	San Antonio Water System	San Antonio	Review of monthly discharge data showed that the chlorine load was double counted using concentrations reported for 2 monitoring points on the same pipe.	Only use monitoring data from MLOC A (After disinfect) to calculate load.
Pulp, Paper, and Paperboard	WA0000922	Port Townsend Paper	Port Townsend	Facility flow rates are unreasonably high. Review of NPDES Fact Sheet indicated that flow was reported in units of GPD, but labeled in PCS as MGD.	Change units on flow from MGD to GPD.
Iron and Steel Manufacturing	WV0004502	Wheeling - Nisshin Inc.	Follansbee	Facility contact provided 2002 DMR data for sulfide and lead to correct the concentrations and quantities in the PCS database.	Recalculate sulfide and lead loads using 2002 dmr data. Note: Monitoring for sulfide is a new requirement that became effective in April 2002.
Petroleum Refining	LA0003026	ConocoPhillips Lake Charles Refy	Westlake	Facility contact reported a transcription error occurred for a monthly reported sulfide discharge.	Recalculated sulfide discharged based on corrected monthly data.
Pulp, Paper, and Paperboard	OR0001074	Pope & Talbot Inc	Halsey	The mill provided discharge monitoring data for final effluent. Discharge monitoring reports submitted in 2002 were below detection limit, but not labeled with “less than” on a “non-detect”.	Changed dioxin load to zero pounds discharged.
Pulp, Paper, and Paperboard	PA0002143	Weyerhaeuser Co/Johnsonburg Mill	Johnsonburg	The mill provided discharge monitoring data documenting discharges below detection for the entire year.	Changed dioxin load to zero pounds discharged.
Pulp, Paper, and Paperboard	MD0021687	Upper Potomac River Comm STP	Westernport	The POTW expressed that the “less than” sign was omitted from the discharge monitoring report (DMR). A corrected DMR has been resubmitted to the state.	Changed dioxin load to zero pounds discharged.

Table 6-5 (Continued)

Point Source Category	NPDES ID	Facility Name	City	Findings from Review	Recommended Loads Changes
Pulp, Paper, and Paperboard	TN0002356	Bowater Inc Southern Division	Calhoun	The mill provided lab reports for 2002. Each dioxin and furan congener concentration reported by the lab was either not detected, or estimated because it was below the calibration curve.	Changed dioxin load to zero pounds discharged.
Pulp, Paper, and Paperboard	OR0000795	Fort James Operating Co	Wauna	The mill expressed that the measurements reported on the discharge monitoring report for October and March of 2002 were below the cluster rule established minimum levels.	Changed dioxin load to zero pounds discharged.
Pulp, Paper, and Paperboard	GA0002798	Weyerhaeuser Co-Port Wentworth	Savannah	The mill expressed the laboratory estimated a furan maximum three times during 2002. The mill claims that these results were “likely noise from contamination that could not be filtered or ruled out”.	Changed dioxin load to zero pounds discharged.

Table 6-6. TRI Facility Review

Facility Name	Facility Location	Point Source Category	Chemical(s) in Question	Facility's Response	Load Recommendations
AK Steel Corp.	Rockport, IN	Iron and Steel Manufacturing	Sodium Nitrite	Facility measures nitrite concentrations. The facility knows that there is also sodium in the wastewater and calculates a load for sodium nitrite based on molecular weights.	Do not change the sodium nitrite discharge of 1,858,000 lbs in 2002. In 2001, reported 1,300,00 lbs of sodium nitrite. In 2003, reported 389,544 lbs of sodium nitrite.
Kaiser Aluminum & Chemical Corp.	Spokane, WA	Aluminum Forming	Polychlorinated Biphenyls	The facility measured their final effluent for PCBs several times during the year and recorded high concentrations a few times.	Do not change the PCB discharge.
Kimberly-Clark	Everett, WA	Pulp, Paper and Paperboard	Dioxin and Dioxin-like Compounds	The facility based its discharge on emission factors created from mill-specific data. The facility then calculated stream partition factors to determine the path of the dioxins. The facility analyzed and detected dioxins in their wastewater.	Do not change dioxin discharges for rankings. Information will be looked at more closely for detailed study.
ONYX Environmental Services	Port Arthur, TX	Landfills/Waste Combustors	Toxaphene, Chlordane, and Heptachlor	The facility analyzed its wastewater, but none of the chemicals were ever detected. The releases were based on ½ the detection limit.	Change the toxaphene, chlordane, and heptachlor releases to 0.0.
Clean Harbors	Deer Park, TX	Landfills/Waste Combustors	Toxaphene, Chlordane, Heptachlor, Hexachlorobenzene, and Benzidine	The facility analyzed and detected every one of these chemicals each month during 2002.	Do not change any of the discharges.
Marathon Ashland Petroleum	Detroit, MI	Petroleum Refining	Dioxin and Dioxin-like Compounds and Polycyclic Aromatic Compounds	The dioxin discharge was retracted due to a unit conversion error in the calculation. PACs were analyzed and detected once in 2001. A list of the PACs detected can be seen in the telecon.	Change dioxin discharge to 0.0. Do not change the PACs discharge. Also retracted dioxin reported in 2000. This was noted in the TSD.

Table 6-6 (Continued)

Facility Name	Facility Location	Point Source Category	Chemical(s) in Question	Facility's Response	Load Recommendations
Eastman Kodak	Rochester, NY	Metal Finishing	Dioxin and Dioxin-like Compounds and Polycyclic Aromatic Compounds	The facility estimates its dioxin and PACs discharges based on analysis of sludge from its wastewater treatment facility. The source of the dioxin is the coal boilers used to produce electricity. The source of the PACs is unknown.	Do not change the release loads of dioxin and PACs. Facility reports as SIC code 3861 (Photographic Equipment and Supplies, in Metal Finishing Category). Do not change SIC code.
Vonroll America	East Liverpool, OH	Landfills/Waste Combustors	Benzidine	The facility reports its benzidine release as range code 'B' (11-499). The actual value the facility calculated was 16.68 lbs. However, benzidine was never detected and the value is based on the detection limit.	Change the benzidine discharge to 0.0.
DuPont	Edge Moor, DE	Inorganic Chemicals (TiO_2)	Polychlorinated Biphenyls, Dioxin and Dioxin-like Compounds, Hexachlorobenzene, Pentachlorobenzene, and Manganese	Dioxin: Used weighted average from 1 sample from 1999 and 2 samples from 2002. All but 1 sample in 2002 was ND. Hexachlorobenzene: Used ½ detection limit. 1 sample was ND. Pentachlorobenzene: Used ½ detection limit. 1 sample was ND. Manganese: Measured concentrations from 2001 times annual flow. PCBs: Measured samples from wastewater and stormwater. No NDs.	Dioxin: Do not change the dioxin discharge. Hexachlorobenzene: Change to 0.0 Pentachlorobenzene: Change to 0.0 Manganese: Do not change value. PCBs: Do not change value.

Table 6-6 (Continued)

Facility Name	Facility Location	Point Source Category	Chemical(s) in Question	Facility's Response	Load Recommendations
DuPont	New Johnsonville, TN	Inorganic Chemicals (TiO_2)	Dioxin and Dioxin-like Compounds, Hexachlorobenzene, Pentachlorobenzene, Nickel, and Chromium	Dioxin: Used data from 1 sample in 2000. Got value of 16.2 grams when ND was set to 0. Hexachlorobenzene: Used ½ the detection limit. 1 sample was ND. Pentachlorobenzene: Used empirical ratio of PeCB to D&DLC found at another site. No wastewater analysis. Nickel: Used weekly measurements and monthly discharge flows. Chromium: Used weekly measurements and monthly discharge flows.	Dioxin: Do not change value. Hexachlorobenzene: Change to 0.0. Pentachlorobenzene: Do not change value. Nickel: Do not change value. Chromium: Do not change value.

7.0 RESULTS OF 2005 SCREENING-LEVEL ANALYSIS

This section describes the results of the 2005 screening-level analysis and the methodology used by EPA to prioritize categories for further review. This section also discusses the identification of categories warranting detailed studies. The remainder of this section is divided into the following subsections:

- Section 7.1 - Preliminary Results of the Screening-Level Review;
- Section 7.2 - Prioritization of Categories; and
- Section 7.3 - Identification of Categories for Further Review.

7.1 Preliminary Results of the Screening-Level Review

The purpose of the screening-level review is to evaluate the amount and toxicity of the pollutants in an industrial category's discharges. Using data from TRI and PCS, EPA ranked point source categories according to their discharges of toxic and non-conventional pollutants (reported in units of toxic-weighted pound equivalent or TWPE). As described earlier in this report, EPA multiplied the pounds of pollutants discharged by TWFs resulting in an estimate of TWPE. Discharges were assigned to industrial categories on the basis of facility SIC codes. Categories included both facilities subject to the existing effluent guidelines for the category, and those belonging to potential new subcategories of existing categories.

Tables 7-1 and 7-2 present, for categories for which EPA has promulgated effluent guidelines and standards, the preliminary rankings using PCS and TRI data, respectively. Discharges from facilities that produce vinyl chloride or that produce chlorine by the chlor-alkali process are listed on these tables as a separate category. See Section 7.2.1 for further discussion. Tables 7-1 and 7-2 include discharges associated with facilities subject to the point source category applicability, as well as facilities that are associated with potential new subcategories of existing categories. Table 7-3 presents a list of these potential new subcategories.

Table 7-1. PCS Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	TWPE
1	454	Gum and Wood Chemicals	3,819,669.49
2	414	Organic Chemicals, Plastics and Synthetic Fibers	1,711,005.07
3	423	Steam Electric Power Generation	1,622,191.21
4	430.1-3	Pulp, Paper and Paperboard (Phases I, II, and III)	1,520,479.46
5	420	Iron and Steel Manufacturing	1,421,855.08
6	422	Phosphate Manufacturing	1,276,142.18
7	433	Metal Finishing	510,708.46
8	421	Nonferrous Metals Manufacturing	450,524.78
9	414.1	Vinyl Chloride and Chlor-Alkali	432,927.83
10	440	Ore Mining and Dressing	406,548.47
11	463	Plastic Molding and Forming	172,483.33
12	419	Petroleum Refining	166,044.85
13	418	Fertilizer Manufacturing	143,794.87
14	415	Inorganic Chemicals	139,681.97
15	410	Textile Mills	124,084.66
16	432	Meat and Poultry Products	64,153.78
17	436	Mineral Mining and Processing	61,400.16
18	445	Landfills	58,808.42
19	444	Waste Combustors	58,808.42
20	455	Pesticide Chemicals Manufacturing	50,689.98
21	439	Pharmaceutical Manufacturing	50,456.51
22	467	Aluminum Forming	19,840.96
23	413	Electroplating	19,482.18
24	409	Sugar Processing	16,575.45
25	457	Explosives	14,451.56
26	464	Metal Molding and Casting (Foundries)	9,886.43
27	407	Fruits and Vegetable Processing	7,452.65
28	424	Ferroalloy Manufacturing	6,652.24
29	471	Nonferrous Metals Forming and Metal Powders	5,762.53
30	469	Electrical and Electronic Components	5,070.37
31	425	Leather Tanning and Finishing	3,785.35
32	468	Copper Forming	3,550.11
33	466	Porcelain Enameling	3,478.49
34	437	Centralized Waste Treaters	3,428.59

Table 7-1 (Continued)

Rank	40 CFR Part	Point Source Category	TWPE
35	428	Rubber Manufacturing	2,386.42
36	411	Cement Manufacturing	2,107.08
37	426	Glass Manufacturing	1,411.08
38	408	Canned and Preserved Seafood	990.87
39	406	Grain Mills Manufacturing	976.18
40	429	Timber Products Processing	915.25
41	438	Metal Products and Machinery	723.57
42	434	Coal Mining	670.57
43	443	Paving and Roofing Materials (Tars and Asphalt)	565.22
44	451	Aquatic Animal Production Industry	500.92
45	417	Soaps and Detergents Manufacturing	269.92
46	461	Battery Manufacturing	88.46
47	405	Dairy Products Processing	44.74
48	460	Hospital	6.18
49	435	Oil & Gas Extraction	1.18
50	459	Photographic	0.00
51	412	Concentrated Animal Feeding Operations (CAFO)	0.00
52	427	Asbestos Manufacturing	no PCS reporters
53	442	Transportation Equipment Cleaning	no PCS reporters
54	446	Paint Formulating	no PCS reporters
55	447	Ink Formulating	no PCS reporters
56	458	Carbon Black Manufacturing	no PCS reporters
57	465	Coil Coating	no PCS reporters
		SUM	**14,393,533.56**

Source: *PCSLoads2002_v02* Database.

Table 7-2. TRI Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	TWPE
1	414.1	Vinyl Chloride and Chlor-Alkali	9,170,594.24
2	430.1-3	Pulp, Paper and Paperboard (Phases I, II, and III)	3,128,678.31
3	433	Metal Finishing	972,114.64
4	467	Aluminum Forming	941,175.90
5	420	Iron and Steel Manufacturing	833,619.54
6	423	Steam Electric Power Generation	804,635.14
7	414	Organic Chemicals, Plastics and Synthetic Fibers	627,857.34
8	455	Pesticide Chemicals Manufacturing	554,485.29
9	419	Petroleum Refining	503,802.24
10	415	Inorganic Chemicals	280,976.66
11	445	Landfills	220,577.01
12	444	Waste Combustors	220,577.01
13	428	Rubber Manufacturing	173,304.23
14	463	Plastic Molding and Forming	97,296.77
15	466	Porcelain Enameling	88,749.45
16	429	Timber Products Processing	71,784.74
17	471	Nonferrous Metals Forming and Metal Powders	71,383.85
18	440	Ore Mining and Dressing	66,544.23
19	421	Nonferrous Metals Manufacturing	63,694.03
20	464	Metal Molding and Casting (Foundries)	47,630.36
21	437	Centralized Waste Treaters	38,054.55
22	413	Electroplating	34,850.78
23	410	Textile Mills	32,764.62
24	432	Meat and Poultry Products	21,982.96
25	454	Gum and Wood Chemicals	15,610.90
26	439	Pharmaceutical Manufacturing	9,912.61
27	418	Fertilizer Manufacturing	6,403.02
28	468	Copper Forming	5,845.24
29	407	Fruits and Vegetable Processing	4,041.90
30	406	Grain Mills Manufacturing	3,882.36
31	469	Electrical and Electronic Components	3,680.68
32	424	Ferroalloy Manufacturing	3,540.83
33	425	Leather Tanning and Finishing	3,398.67
34	461	Battery Manufacturing	3,062.52
35	426	Glass Manufacturing	2,456.31

Table 7-2 (Continued)

Rank	40 CFR Part	Point Source Category	TWPE
36	434	Coal Mining	2,353.89
37	411	Cement Manufacturing	2,024.89
38	417	Soaps and Detergents Manufacturing	1,983.48
39	436	Mineral Mining and Processing	1,422.22
40	405	Dairy Products Processing	633.31
41	435	Oil & Gas Extraction	553.40
42	446	Paint Formulating	528.67
43	458	Carbon Black Manufacturing	513.90
44	460	Hospital	381.87
45	422	Phosphate Manufacturing	376.89
46	457	Explosives	249.40
47	438	Metal Products and Machinery	213.00
48	409	Sugar Processing	112.35
49	443	Paving and Roofing Materials (Tars and Asphalt)	104.20
50	447	Ink Formulating	91.51
51	408	Canned and Preserved Seafood	35.09
52	465	Coil Coating	12.15
53	427	Asbestos Manufacturing	5.92
54	421	Concentrated Animal Feeding Operations (CAFO)	no TRI reporters
55	442	Transportation Equipment Cleaning	no TRI reporters
56	451	Concentrated Aquatic Animal Production	no TRI reporters
57	459	Photographic	no TRI reporters
		SUM	**19,140,565.08**

Source: *TRIReleases2002_v02* Database.

Table 7-3. SIC Codes Classified As Potential New Subcategories of Categories with Existing Regulations

40 CFR Part	Point Source Category	SIC Codes for "Potential New Subcategory"	SIC Description
406	Grain Mills Manufacturing	5159	Farm-Product Raw Materials
410	Textile Mills	2399	Fabricated Textile Products NEC
		2322	Men's & Boys Underwear & Night
		2396	Automotive Trimmings, Apparel
411	Cement Manufacturing	3272	Concrete Prod Exc Blck & Brick
		3273	Ready-Mixed Concrete
414	Organic Chemicals, Plastics and Synthetic Fibers	5169	Chemicals and Allied Products
		2842	Specialty Cleaning, Polishing
		2844	Perfumes, Cosmetics, Toilet Prep
		2891	Adhesives and Sealants
		2899	Chemicals & Chem Prep, NEC
417	Soaps and Detergents Manufacturing	2843	Surf Active Agent, Fin Agents
419	Petroleum Refining	2992	Lubricating Oils and Greases
		2999	Prod of Petroleum & Coal, NEC
		4612	Crude Petroleum Pipelines
		5171	Petroleum Bulk Stations & Term
423	Steam Electric Power Generation	4961	Steam & Air-Conditioning Sup
		4939	Combination Utilities, NEC
426	Glass Manufacturing	3231	Glass Prod Made of Purch. Glas
429	Timber Products Processing	2541	Wood Parti, Shelf, Lock, etc.
		2431	Millwork
		2439	Structural Wood Members, NEC
		2521	Wood Office Furniture
		2511	Wood Household Furn, Exc Uphol
		2512	Wood Household Furn, Upholster
		2434	Wood Kitchen Cabinets
		2517	Wood TV, Radio, Phono Cabinet
430	Pulp, Paper and Paperboard	2656	Sanitary Food Containers
		2653	Corrugated/Solid Fiber Boxes
		2657	Folding Paperboard Boxes
		2679	Conv Paper & Paperboard Products
		2655	Fiber Cans, Tubes, Drums & Prod

Table 7-3 (Continued)

40 CFR Part	Point Source Category	SIC Codes for "Potential New Subcategory"	SIC Description
430	Pulp, Paper and Paperboard (continued)	2674	Bags, Uncoated Paper & Multiwall
		2671	Coated & Laminated Packaging
		2672	Coated & Laminated, NEC
433	Metal Finishing	7692	Welding Repair
		4011	Railroads, Line Haul Operating
		4013	Railroad Switching & Term Estab
436	Mineral Mining and Processing	3253	Ceramic Wall and Floor Tile
		3291	Abrasive Products
		3261	Vitreous China Plumbing Fixture
		3297	Nonclay Refractories
		3274	Lime
		3264	Porcelain Electrical Supplies
		3262	Vit China Table & Kitchen Articl
		3255	Clay Refractories
		3299	Nonmetallic Mineral Prod, NEC
		3263	Fine Earthenware
		3269	Pottery Products, NEC
		3251	Brick and Structural Clay Tile
		3259	Structural Clay Products NEC
		5032	Brick, Stone & Relat Materials
		3295	Mine & Earths, Ground or Treat
438	Metal Products and Machinery	4011	Railroads, Line Haul Operating
		4013	Railroad Swtching & Term Estab
439	Pharmaceutical Manufacturing	2835	Diagnostic Substances
		2836	Biological Prod, Except Diagnos

7.2 Prioritization of Categories

The next step in the screening-level review of categories with existing regulations was to prioritize (rank) the categories for further review. EPA eliminated certain data from further use in prioritizing categories. The data EPA did not use to develop category rankings included discharges from facilities for which EPA is currently revising effluent guidelines, discharges from categories for which EPA has recently promulgated or revised effluent guidelines, and discharges from facilities determined not to be representative of their category. These data and the reasons EPA did not use them are discussed below.

7.2.1 Facilities for Which EPA is Currently Developing or Revising ELGs

EPA is currently in the process of revising effluent guidelines for discharges from facilities that produce vinyl chloride and/or that produce chlorine by the chlor- alkali process. Effluent guidelines for Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) and the Inorganic Chemicals Manufacturing Point Source Categories are currently applicable to discharges from these facilities. EPA is investigating expanding the regulations to cover additional pollutants. Because a rulemaking is already underway, discharges from these facilities were excluded from further consideration under the current planning cycle. EPA subtracted the TWPE loads from facilities that produce vinyl chloride and or chlorine by the chlor-alkali process from the OCPSF and Inorganic Chemicals Manufacturing Point Source Category loads. EPA included loads for other facilities in these two categories while it prioritized categories for further review.

7.2.2 Categories for Which EPA Recently Promulgated or Revised ELGs

For development of category rankings, EPA did not use data from point source categories for which effluent guidelines were recently established or revised but not yet fully implemented. In general, EPA removes an industrial point source category from further consideration during the current review cycle if EPA established or revised the category's effluent guidelines within seven years prior to the current annual review. This seven year period allows time for the effluent guidelines to be incorporated into NPDES permits. For the 2005 annual review, this eliminates any category with effluent guidelines established or revised, since 1998, as shown in Table 7-4.

Not including a category in the development of the rankings does not mean that EPA eliminates the category from annual review. For example, in cases where EPA is aware of the growth of a new segment within such category, or where new concerns are identified for previously unevaluated pollutants discharged by facilities in the category, EPA would apply closer scrutiny to the discharges from the category in deciding whether to consider it further during the current review cycle.

Table 7-4. Point Source Categories That Have Undergone a Recent Rulemaking or Review

40 CFR Part Number	Point Source Category	Date of Rulemaking
451	Concentrated Aquatic Animal Production (or Aquaculture)	August 23, 2004
432	Meat and Poultry Products	September 8, 2004
413, 433, and 438	Metal Products and Machinery (including Metal Finishing and Electroplating)	May 13, 2003
122, 123, and 412	Concentrated Animal Feeding Operations (CAFO)	February 12, 2003
420	Iron and Steel Manufacturing	October 17, 2002
434	Coal Mining (Coal Remining and Western Alkaline Coal Mining)	January 23, 2002
435	Oil & Gas Extraction (Synthetic-Based and Other Non-Aqueous Drilling Fluids)	February 21, 2001
136 and 437	Centralized Waste Treatment	December 22, 2000
442	Transportation Equipment Cleaning	August 14, 2000
444	Commercial Hazardous Waste Combustors	January 27, 2000
136 and 445	Landfills	January 19, 2000

Source: The Environmental Protection Agency (EPA). http://www.epa.gov/ost/guide.

7.2.3 Categories with One Facility Dominating the TWPE

EPA also looked more closely at point source categories where only one facility was responsible for most of the TWPE reported to be discharged. These categories are listed in Table 7-5. EPA identified seven facilities that were dominating the TWPE in the point source category to which they belonged. EPA investigated these facilities to determine if their discharges were representative of the category. If they were not, EPA subtracted the facility's

TWPE from the total category TWPE. EPA's investigations of these facilities is detailed in a separate memorandum, dated April 14, 2005 and entitled *PCS and TRI Facilities that Dominate Total Point Source Category TWPE*.

Table 7-5. Point Source Categories with One Facility Dominating the TWPE Discharges

Point Source Category	Facility with Over 95% of Category TWPE	City, State	Data Source	Facility TWPE	% of Total Category TWPE
Gum and Wood Chemicals Manufacturing	Hercules-Brunswick	Brunswick, GA	PCS	3,801,997	99.5%
Phosphate Manufacturing	IMC Phosphates	Uncle Sam, LA	PCS	1,231,795	96.5%
Miscellaneous Foods and Beverages	Bacardi Corporation	Catano, PR	PCS	324,895	95.0%
Plastic Molding and Forming	Innovia Films	Tecumseh, KS	PCS	172,018	99.7%
Aluminum Forming	Kaiser Aluminum & Chemical Corporation	Spokane, WA	TRI	935,938	99.4%

Source: *TRIReleases2002_v02* Database, *PCSLoads2002_v02* Database.

7.2.4 Combining the Final PCS and TRI Rankings

EPA consolidated the PCS and TRI Rankings into one set of combined rankings in the following steps:

- EPA combined the two (i.e., PCS and TRI) lists of point source categories by adding each category's PCS TWPE and TRI TWPE. EPA noted that this may result in "double counting" of chemicals a facility reported to both PCS and TRI, and "single counting" of chemicals reported in only one of the databases.
- EPA then ranked the point source categories based on total PCS and TRI TWPE.

EPA used the resulting ranking, which is based on the total PCS and TRI TWPE, to prioritize its review of industries that appeared to offer the greatest potential for reducing hazard to human health or the environment. In the 2003 and 2004 annual reviews EPA separately evaluated the TWPE estimates from the PCS and TRI databases. EPA finds that combining the TWPE estimates from the TRI and PCS databases into a single number better focuses the Agency's attention on the industries with the most toxic pollution.

The combined rankings are shown in Table 7-6.

7.3 Identification of Categories With Existing Effluent Guidelines for Further Review

After completing the development of the prioritized list, shown in Table 7-6, EPA selected for further review the point source categories that cumulatively discharge 95 percent of the total PCS and TRI TWPE. The cutoff point is shown as a bold line in Table 7-6.

EPA selected the two categories with the largest combined TWPE for detailed studies. The purpose of the detailed studies is to determine whether it would be appropriate for EPA to identify these industrial categories for potential effluent guidelines revision in the 2006 final Plan. EPA is conducting detailed studies of two categories with existing effluent guidelines. These categories are:

- Pulp, Paper, and Paperboard; and
- Steam Electric Power Generating.

Information collected in support of these studies will be available for public comment along with the preliminary plan. EPA will consider public comments on the preliminary information as it completes the detailed studies and publishes its final 2006 Plan.

EPA's Detailed Studies will examine: (1) wastewater characteristics and pollutant sources; (2) the pollutants driving the toxic-weighted pollutant discharges; (3) availability of pollution prevention and treatment; (4) the geographic distribution of facilities in the industry; (5) any pollutant discharge trends within the industry; and (6) any relevant economic factors. For the detailed studies, EPA may consult data sources that include: (1) U.S. Economic Census; (2) TRI and PCS data; (3) contacts with trade associations and reporting facilities to verify reported releases and facility categorization; (4) contacts with regulatory authorities (states and EPA regions), to understand how category facilities are permitted; (5) NPDES permits and their supporting fact sheets; (6) EPA effluent guidelines technical development documents; (7) relevant EPA preliminary data summaries or study reports; and (8) technical literature on pollutant sources and control technologies.

EPA will conduct further category review of 11 existing point source categories. These categories are:

- Organic Chemicals, Plastics, and Synthetic Fibers;
- Petroleum Refining;
- Pesticide Chemicals;
- Nonferrous Metals Manufacturing;
- Ore Mining and Dressing;
- Inorganic Chemicals Manufacturing;
- Rubber Manufacturing;
- Textile Mills;
- Fertilizer Manufacturing;
- Plastics Molding and Forming; and
- Porcelain Enameling.

The purpose of the further category review is to verify preliminary screening-level results. EPA will review reported discharges of highly toxic pollutants. EPA will contact facilities to determine if TRI-reported discharges were based on measurements or ½ detection limit and to determine if PCS data correctly reflect facility DMRs. Where pollutants are confirmed present in facility discharges, EPA will review existing information to tentatively identify the process sources of discharged pollutants and potential control and treatment technologies.

After considering the results of the studies, EPA will determine whether further study or development or revision of an effluent guideline is appropriate. Final determinations will be presented in the 2006 Effluent Guidelines Plan

Table 7-6. Final PCS and TRI Combined Point Source Category Rankings

40 CFR Part	Point Source Category	TRI TWPE	PCS TWPE	Total TWPE	Cumulative % of Total TWPE	Rank
430	Pulp, paper and paperboard	3,128,678	1,520,479	4,649,158	34.75%	1
423	Steam electric power generation	804,635	1,622,191	2,426,826	52.90%	2
414	Organic chemicals, plastics and synthetic fibers	627,857	1,711,005	2,338,862	70.38%	3
419	Petroleum refining	503,802	166,045	669,847	75.39%	4
455	Pesticide chemicals	554,485	50,690	605,175	79.91%	5
421	Nonferrous metals manufacturing	63,694	450,525	514,219	83.75%	6
440	Ore mining and dressing	66,544	406,548	473,093	87.29%	7
415	Inorganic chemicals	280,977	139,682	420,659	90.44%	8
428	Rubber Manufacturing	173,304	2,386	175,691	91.75%	9
410	Textile mills	32,765	124,085	156,849	92.92%	10
418	Fertilizer manufacturing	6,403	143,795	150,198	94.04%	11
463	Plastic molding and forming	97,297	466	97,762	94.77%	12
466	Porcelain Enameling	88,749	3,478	92,228	95.46%	13
471	Nonferrous metals forming and metal powders	71,384	5,763	77,146	96.04%	14
429	Timber products processing	71,785	915	72,700	96.58%	15
436	Mineral Mining and Processing	1,422	61,400	62,822	97.05%	16
NA	Miscellaneous Foods and Beverages	52,034	9,813	61,847	97.52%	17
439	Pharmaceutical manufacturing	9,912	50,457	60,369	97.97%	18
464	Metal molding and casting (foundries)	47,630	9,886	57,517	98.40%	19
422	Phosphate manufacturing	377	44,347	44,724	98.73%	20
454	Gum and wood chemicals	15,611	17,673	33,284	98.98%	21
467	Aluminum forming	5,238	19,841	25,079	99.17%	22
409	Sugar processing	112	16,575	16,688	99.29%	23
457	Explosives	249	14,452	14,701	99.40%	24
407	Fruits and vegetable processing	4,042	7,453	11,495	99.49%	25
424	Ferroalloy manufacturing	3,541	6,652	10,193	99.56%	26
468	Copper forming	5,845	3,550	9,395	99.63%	27

Table 7-6 (Continued)

40 CFR Part	Point Source Category	TRI TWPE	PCS TWPE	Total TWPE	Cumulative % of Total TWPE	Rank
469	Electrical and electronic components	3,681	5,070	8,751	99.70%	28
425	Leather tanning and finishing	3,399	3,785	7,184	99.75%	29
NA	Tobacco Products	6,933	3	6,936	99.80%	30
406	Grain mills manufacturing	3,882	976	4,859	99.84%	31
411	Cement manufacturing	2,025	2,107	4,132	99.87%	32
426	Glass manufacturing	2,456	1,411	3,867	99.90%	33
461	Battery manufacturing	3,063	88	3,151	99.92%	34
417	Soaps and detergents manufacturing	1,983	270	2,253	99.94%	35
NA	Printing & Publishing	205	1,677	1,882	99.96%	36
NA	Airport Deicing	-	1,156	1,156	99.96%	37
408	Canned and preserved seafood	35	991	1,026	99.97%	38
NA	Independent and Stand Alone Labs	128	611	740	99.98%	39
405	Dairy products processing	633	45	678	99.98%	40
443	Paving and roofing materials (tars and asphalt)	104	565	669	99.99%	41
446	Paint formulating	529	-	529	99.99%	42
458	Carbon black manufacturing	514	-	514	99.99%	43
460	Hospital	382	6	388	100.00%	44
NA	Construction and Development	-	186	186	100.00%	45
447	Ink formulating	92	-	92	100.00%	46
465	Coil coating	12	-	12	100.00%	47
427	Asbestos manufacturing	6	-	6	100.00%	48
459	Photographic	-	0	0	100.00%	49
	Total	**6,748,208**	**6,629,103**	**13,377,538**		

Sources: *TRIReleases2002_v02* Database and *PCSLoads2002_v02* Database.
NA - not applicable. There are no existing regulations for this category.